VOLUME 11 • NUMBER 10 • *October 1956*

Geriatrics

DEVOTED TO DISEASES AND PROCESSES OF AGING

Diagnostic Aids in Lung Disease 419

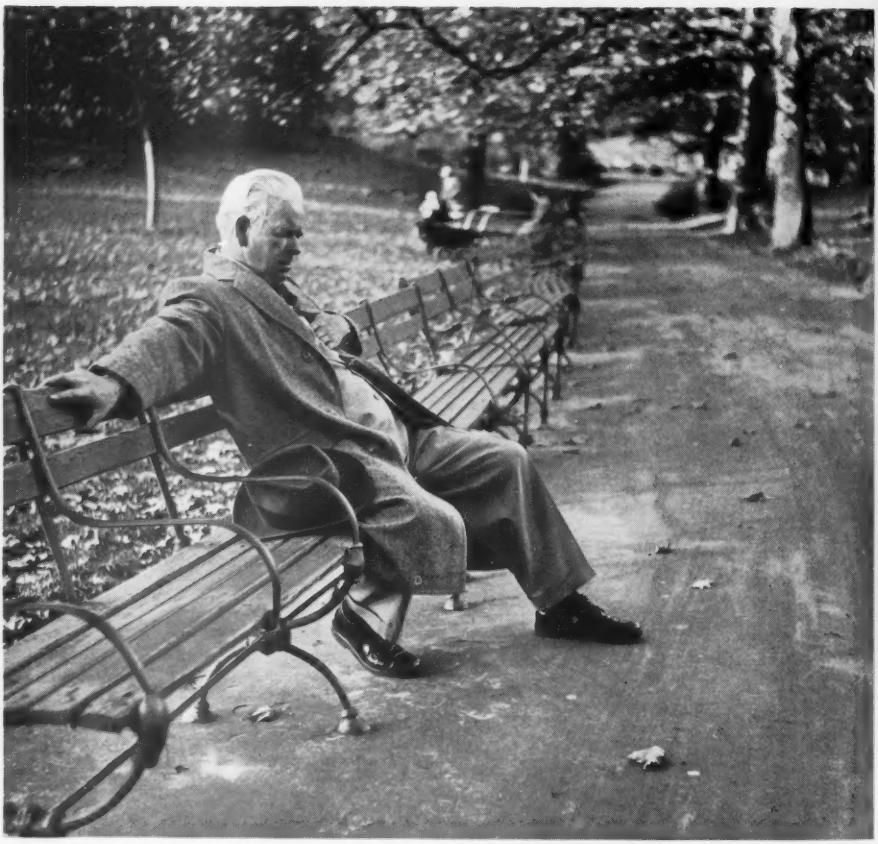
Neuromuscular Problems of the Paralyzed Patient 434

Mastering Long Term Illness 447

Genesis of Arteriosclerosis 456

When Older Physicians Need Help 465

Complete table of contents on page 3A



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References: **1.** Rosenberg, H. N., and Michelson, A. L.: Am. J. M. Sc. *230*:254 (Sept.) 1955. **2.** Kory, R. C., *et al.*: Am. Heart J. *50*:308 (Aug.) 1955. **3.** Winsor, T., and Humphreys, P.: Angiology *3*:1 (Feb.) 1953. **4.** Plotz, M.: New York State J. Med. *52*:2012 (Aug. 15) 1952. **5.** Dailheu-Geoffroy, P.: L'Ouest-Médical, vol. 3 (July) 1950.

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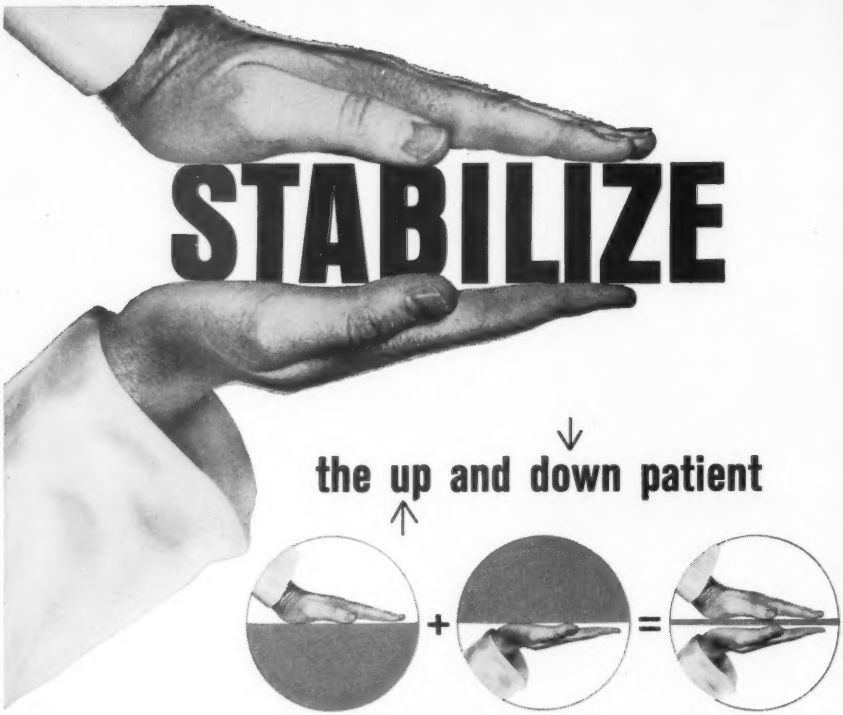

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1. Arnoff, B.: Personal communication. 2. Lazarte, J. A., and Petersen, M.C.: Personal communication.

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Geriatrics

Established 1946

Volume 11
Number 10

CONTENTS • *October 1956*

Practical Pointers on the Differential Diagnosis of Lung Diseases
ANDREW L. BANYAI, M.D. 419

Photoelectric Plethysmography: Methods, Normal Standards, and Clinical Application
ERNST SIMONSON, M.D. 425

Neuromuscular Problems in Hemiplegic and Paraplegic Patients
LENOX D. BAKER, M.D. 434

Management of Dupruyten's Contracture
LEE J. CORDREY, M.D. 440

Diabetes in the Older Age Group
NATHAN BLUMBERG, M.D., and LOUIS ZISSERMAN, M.D. 444

Mastering Long Term Illness
EDWARD L. BORTZ, M.D. 447

Stimulation Therapy for Mental Disorders in Aged Patients
ANDERS DYMLING, M.L., and STEN ECKERSTRÖM, M.D. 453

Response Potentials of Vascular Tissues and the Genesis of Arteriosclerosis: A Review. Part II A. Inflammatory Agents
HERMAN T. BLUMENTHAL, PH.D., M.D. 456

When Older Physicians Need Help *(Sociomedical Progress)*
ARTHUR BOOKMAN, M.D. 465

The Ultimate Adventure *(Editorial)*
JAMES P. WARBASSE, M.D. 468

The Great Need for Lifelong Records of Patients *(Editorial)*
WALTER C. ALVAREZ, M.D. 470

Does the Aging Brain Commonly Deteriorate? *(Editorial)*
WALTER C. ALVAREZ, M.D. 470

Departments

Looking forward 7A
Sociomedical Progress 465
Editorial 468
Book Reviews 471
Digests from Current Literature 473
Activities and Announcements 48A
Manufacturers' Activities 52A

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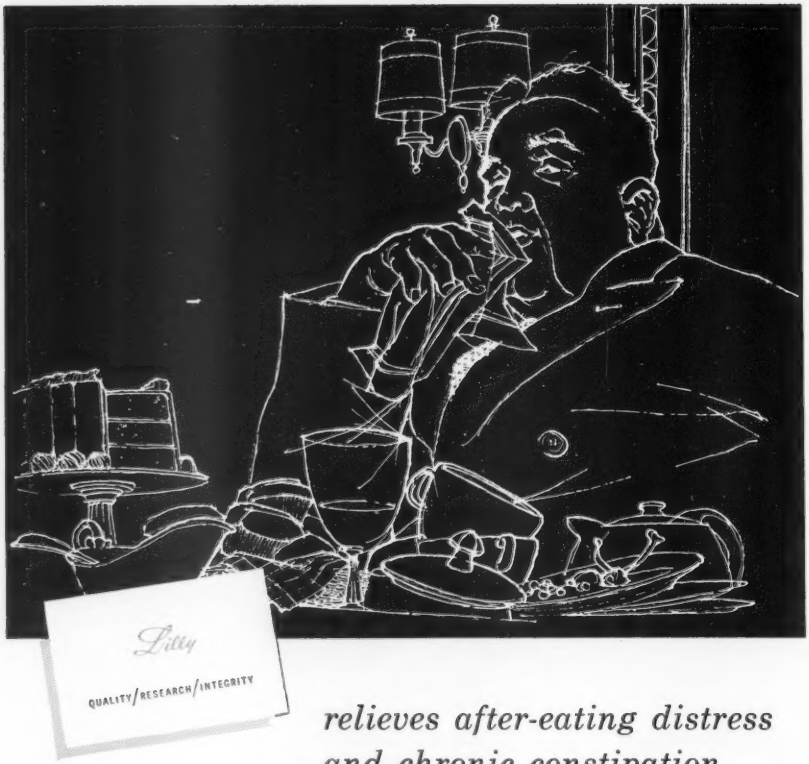

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. . . looking forward

• Among our most urgent medical needs is the *Rehabilitation of the Disabled Older Patient* so that he is restored to a happy, purposeful life, say Glenn Gullickson, Jr., and Frederic J. Kottke of the Department of Physical Medicine and Rehabilitation of the University of Minnesota Medical School. Writing in the November issue of GERIATRICS, they state that, although the majority of geriatric diseases are incurable, most of the conditions are remedial to a certain extent. To illustrate the principles, common problems, and some necessary procedures in such treatment, they discuss the rehabilitation of patients with hemiplegia and those with degenerative joint disease.

• In diagnosing *Lesions of the Colon*, it is not as important to differentiate immediately between the malignant and benign as to establish that the lesion exists, says Orville King, assistant professor of surgery, Graduate School of Medicine, University of Pennsylvania. Such lesions are common in the older age groups, but their signs and symptoms are not consistent. When found, they can and should be removed. Age does not contradict surgical procedures for the elimination of neoplasms located in the large bowel, for abdominal-perineal resection can be carried out even in the ninth decade.

• In order to meet budgetary restrictions, personnel needs, clinical deficiencies, and to bring about effective rehabilitation, it is often necessary to employ special *Rehabilitative Technics Adapted to the Severely Disabled*, says Lewis A. Leavitt, chief of the Physical Medicine and Rehabilitation Service, Veterans Administration Hospital, Houston, Texas. He stresses that such technics should be as functional as possible and simple rather than complex. They should be designed with the possibility of use after discharge from the hospital.

• Arthur L. Murphy presents his experiences with 126 new cases of *Rodent Ulcer* seen during a three-year period at the Head and Neck Tumor Clinic of Victoria General Hospital, Halifax, Nova Scotia. He discusses the varied pathology of the ulcer, the possible contributary causative factors, and the role of diet and endocrine substances in prophylaxis. Treatment of the rodent ulcer may be by roentgen-ray irradiation, after biopsy, of minute lesions, or by excision. Large tumors are treated by wide excision and skin graft. Roentgen-ray irradiation as treatment for precancerous lesions is condemned.

• In order to determine the cause of *Postural Dizziness in the Aged*, E. J. Orma and M. Koskenoja of the Research Center for the Aged, Helsinki, Finland, compared a group of postural dizziness patients with a control group without dizziness. It was ascertained that cerebral neurologic symptoms, headache, tinnitus, cardiac failure, high blood sugar values, and positional nystagmus were significantly more frequent in the postural dizziness group. No other difference was shown between the groups in any aspect of internal medicine, neurology, or ophthalmology.

• *The Significance of Ocular Changes Occurring After Middle Age* is discussed by I. S. Tassman, professor of clinical ophthalmology at the Graduate School of Medicine, University of Pennsylvania. Many changes in the external ocular structure and appendages that occur with aging are not necessarily serious and can be corrected when indicated. In the average case, senile cataract can be removed with recovery of normal vision. The presence of glaucoma, vascular hypertension, diabetes, and other chronic systemic diseases at this age can produce serious changes in the inner structures of the eye, resulting in visual loss.

For these and other articles, abstracts, reviews, and special features, read every issue of GERIATRICS.

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Literature available to physicians—write Medical Service Department.

references: (1) Rottino, A.: Journal-Lancet *71*:237, 1951. (2) Susinno, A. M., and Verdon, R. E.: J.A.M.A. *154*:239 (Jan. 16), 1954.

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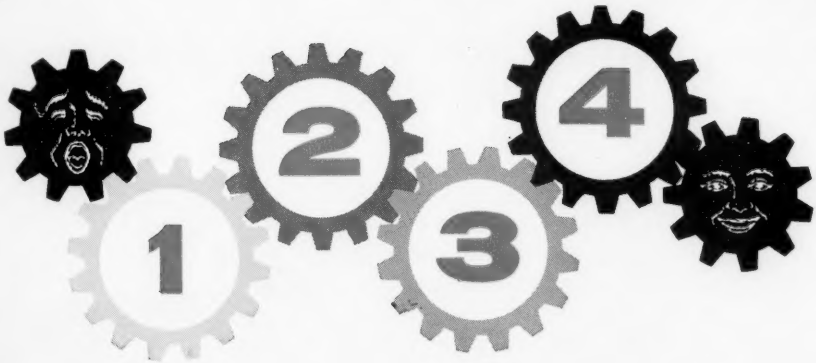

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(1) Stieglitz, E. J., in Wohl, M. G., & Goodhart, R. S.: Modern Nutrition in Health and Disease, Philadelphia, Lea & Febiger, 1955, p. 933. (2) Stare, F. J.: *Bull. New York Acad. Med.* 32:284, 1956. (3) Kaufman, W.: *J. Am. Geriatrics Soc.* 3:927, 1955. (4) Kinsell, L. W.: *J. Am. Geriatrics Soc.* 3:31, 1955. (5) Kaplan, L.; Landes, J. H., & Pincus, J.: *Geriatrics* 10:287, 1955.

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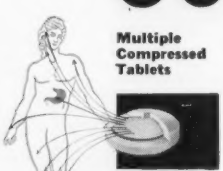

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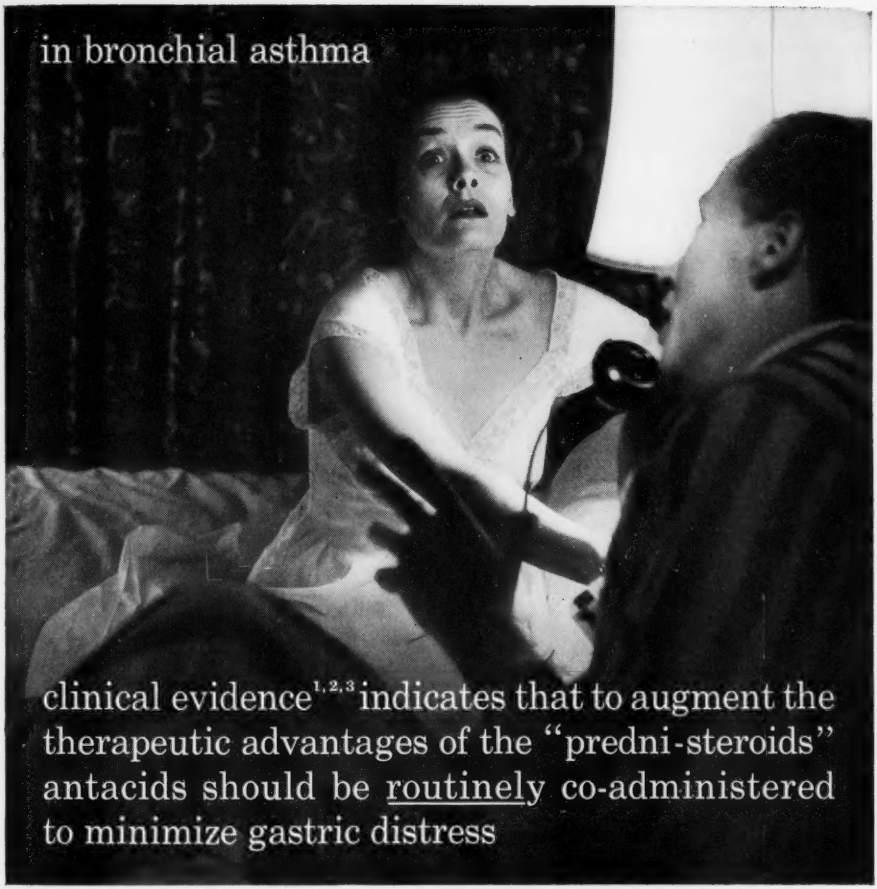
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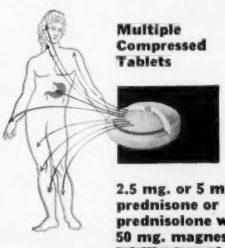

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1. Eisfelder, H.W.: Am. Pract. & Dig. Treat., 5:778 (Oct.) 1954).
2. Sebrell, W.H., Jr.: J.A.M.A., 152:42 (May, 1953).
3. Sherman, R.J.: Medical Times, 82:107 (Feb., 1954).

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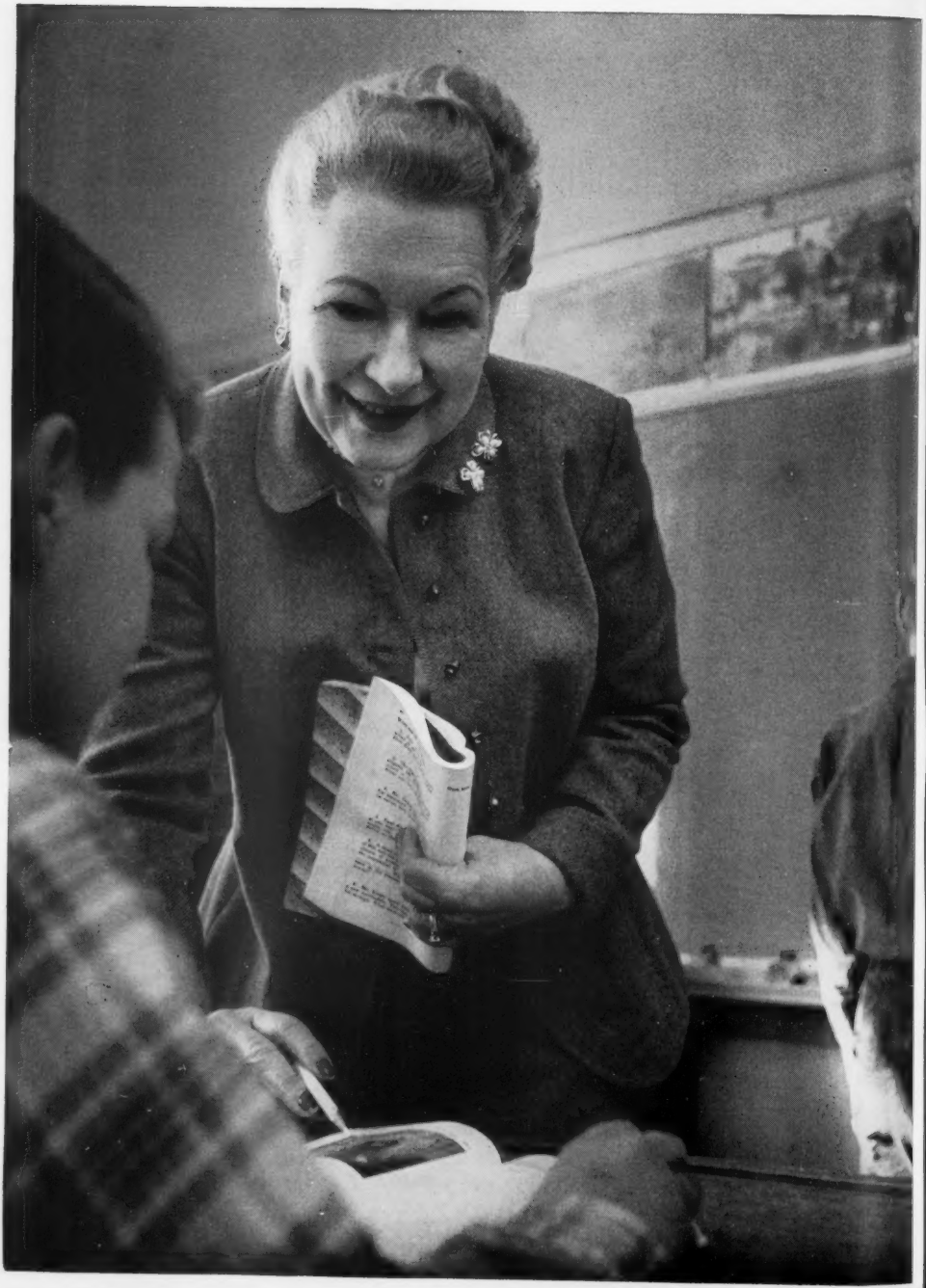
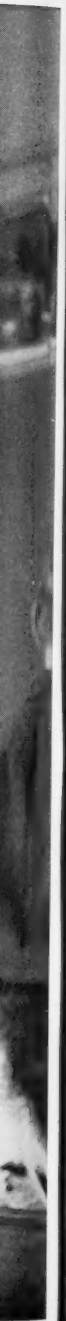


18A



"Yes, I taught grammar to your father— and it seems like only yesterday!"

Time flies happily for the mature person in good health. To help keep these "senior citizens" fit and active, many physicians prescribe GEVRAL—a comprehensive diet supplement specially prepared for persons past 40. Each dry-filled GEVRAL capsule provides 14 vitamins, 11 minerals, and Purified Intrinsic Factor Concentrate.

Gevral*

GERIATRIC VITAMIN-MINERAL SUPPLEMENT LEDERLE

Each GEVRAL Capsule contains:

Vitamin A	5000 U.S.P. Units	Rutin	25 mg.
Vitamin D	500 U.S.P. Units	Purified Intrinsic Factor Concentrate	0.5 mg.
Vitamin B_{12}	1 mcgm.	Iron (as $FeSO_4$)	10 mg.
Thiamine Mononitrate (B_1)	5 mg.	Iodine (as KI)	0.5 mg.
Riboflavin (B_2)	5 mg.	Calcium (as $CaHPO_4$)	145 mg.
Niacinamide	15 mg.	Phosphorus (as $CaHPO_4$)	110 mg.
Folic Acid	1 mg.	Boron (as $Na_2B_4O_7.10H_2O$)	0.1 mg.
Pyridoxine HCl (B_6)	0.5 mg.	Copper (as CuO)	1 mg.
Ca Pantothenate	5 mg.	Fluorine (as CaF_2)	0.1 mg.
Choline Dihydrogen Citrate	100 mg.	Manganese (as MnO_2)	1 mg.
Inositol	50 mg.	Magnesium (as MgO)	1 mg.
Ascorbic Acid (C)	50 mg.	Potassium (as K_2SO_4)	5 mg.
Vitamin E (as tocopheryl acetates)	10 I.U.	Zinc (as ZnO)	0.5 mg.

dry filled sealed capsules for more rapid and complete absorption, freedom from aftertaste. A Lederle exclusive!

Other Lederle geriatric products include: *GEVRABON** Vitamin-Mineral Supplement Liquid with a wine flavor; *GEVRAL** Protein Vitamin-Mineral-Protein Supplement Powder; and *GEVRINE** Vitamin-Mineral-Hormone Capsules.

Lederle LEDERLE LABORATORIES DIVISION *AMERICAN CYANAMID COMPANY* PEARL RIVER, NEW YORK

*REG. U.S. PAT. OFF.

when the geriatric problem is constipation **DIOVAC**™

(Brand of dioctyl sodium sulfosuccinate—sodium benzoate)

DIOVAC promotes normal evacuation through normal bowel function by permitting moisture to penetrate and soften the hard fecal mass; thus it corrects constipation naturally, without the risks or compromises of laxation—an ideal not only for the elderly but for patients of all ages.

new nonlaxative with moistage action

in bottles of 50
DIOVAC CAPSULES
Dry-filled for maximum moisture penetration and no aftertaste.

in 6 oz. bottles
DIOVAC SYRUP
Refreshingly mint flavored.

DOSAGE: One DIOVAC CAPSULE (50 mg.) or 1-2 tsp. of DIOVAC SYRUP (20-40 mg.) once or twice daily followed by a glass of water.

BIBLIOGRAPHIC BACKGROUND

Antos, R. J.: Southwestern Med. 37:236 (Apr.) 1956.

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GRAY PHARMACEUTICAL CO. INC NEWTON 58. MASSACHUSETTS

prior to
plastic pelvic surgery

in atrophic
or senile vaginiti
and pruritus vulvae

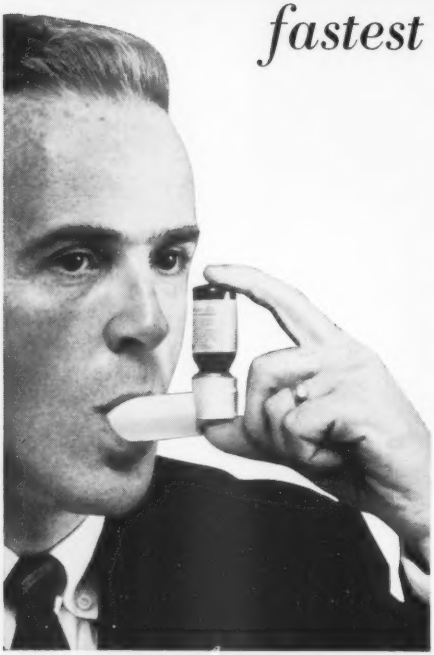
TOPICAL ESTROGEN THERAPY

Ortho®
Dienestrol
Cream
vaginal estrogen therapy

Ortho

In Angina Pectoris

Medihaler-Nitro™



fastest relief of the acute attack

MEDIHALER-NITRO is octyl nitrite (1%) in aerosol solution; delivered by metered-dosage nebulization, using the lungs as portal of entry, it assures fastest relief and prolonged effect; it is free from disagreeable, irritating odor, and less apt to produce side actions than are nitroglycerin and amyl nitrite.

To be used only with the MEDIHALER® ORAL ADAPTER made of unbreakable plastic with no moving parts. Medication and Adapter fit into pocket-size plastic carrying case. One or two inhalations provide prompt relief of an attack of angina pectoris.

MEDIHALER...*The New Measured-Dose Principle of Nebulization*

and for definitive therapy... fewer and fewer attacks of less and less intensity

Long-acting tablets containing pentaerythritol tetranitrate (PETN) 10 mg. and Rauwiloid® (alseroxylon) 1 mg. reduce the incidence and intensity of attacks and lead to objective improvement demonstrable by ECG. Dosage: one or two tablets q.i.d., before meals and on retiring

Pentoxylon®

Riker
LOS ANGELES

"...the results obtained with Senokot, in our old age patients were very good..."
–Glass, G. B. J.: Personal communication, 1956.

IN CONSTIPATION OF THE AGED

SENOKOT is both corrective and rehabilitative... it physiologically resensitizes Auerbach's plexus, restoring normal bowel motility and evacuation of soft, well-formed stools. Once natural function resumes, SENOKOT may be reduced in dosage and eventually discontinued—a consequence of its specific re-educative action.

DOSAGE: One level teaspoonful of granules (or two tablets) at bedtime. Dosage may be increased or decreased to meet the patient's specific needs.

SUPPLIED: Cocoa-flavored granules in 8 and 4 ounce containers. Small unflavored tablets in bottles of 100.

Senokot®

TABLETS
GRANULES

BRAND OF STANDARDIZED CONCENTRATED ACTIVE PRINCIPLES OF CASSIA ACUTIFOLIA PODS

NEW NATURAL BOWEL CORRECTIVE

The Purdue Frederick Company DEDICATED TO PHYSICIAN AND PATIENT SINCE 1892 135 CHRISTOPHER ST., NEW YORK 14, N. Y.

before

pathetic, atonic, antisocia

after

lert, animated, assured

with

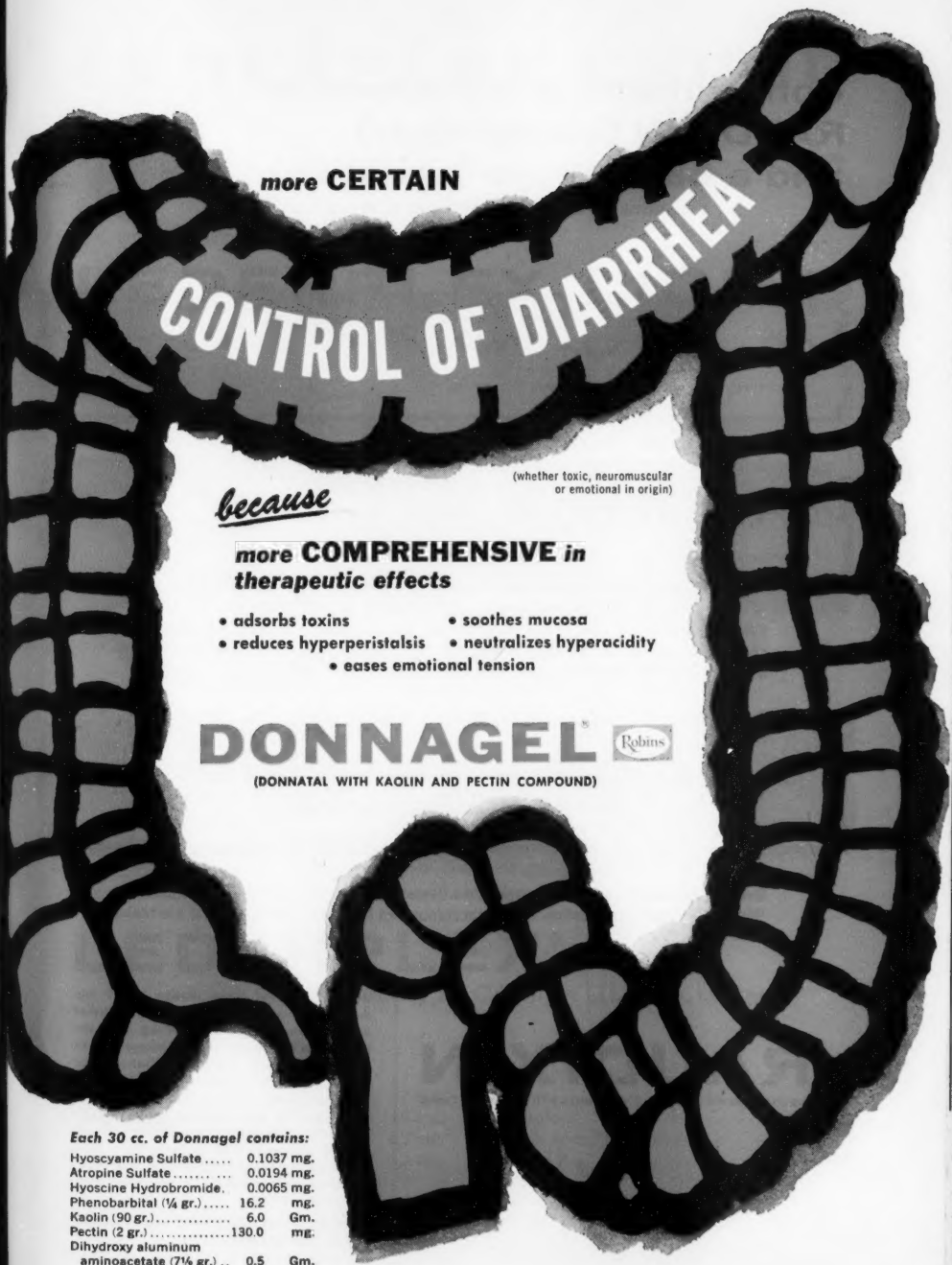
naleptone*

because when depression, mental confusion, emotional lability, irritability, or antisocial attitudes are part of the geriatric syndrome . . . an *analeptic* may be indicated rather than a tranquilizer. The gamut of symptoms caused by hypoxia are effectively relieved or reversed by the cerebral stimulation of ANALEPTONE elixir or tablets.

Formula—*Elixir*, 1 teaspoonful: pentylenetetrazol, 200 mg.; niacin, 100 mg.; Peptenzyme* Elixir q.s.—*Tablets*: pentylenetetrazol, 100 mg.; niacin, 50 mg.; pepsin 1:10,000, 5 mg. Dosage—½ to 1 teaspoonful or 1 to 2 tablets, one to three times per day. Available—in bottles of 8 fl. oz. or 100 tablets.

*T.M.

REED & CARNRICK Jersey City 6, N.J.



Each 30 cc. of Donnagel contains:

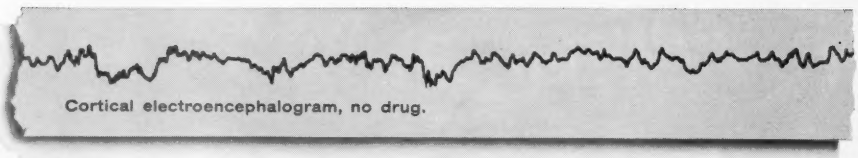
Hyoscyamine Sulfate	0.1037	mg.
Atropine Sulfate	0.0194	mg.
Hyoscine Hydrobromide	0.0065	mg.
Phenobarbital (¼ gr.)	16.2	mg.
Kaolin (90 gr.)	6.0	Gm.
Pectin (2 gr.)	130.0	mg.
Dihydroxy aluminum aminoacetate (7½ gr.)	0.5	Gm.

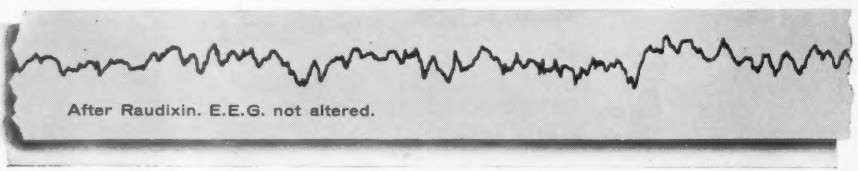
Robins

A. H. ROBINS CO., INC., RICHMOND 20, VA.

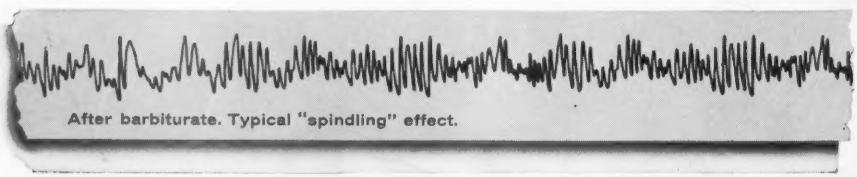
Ethical Pharmaceuticals of Merit since 1878

comparison of the effect of RAUDIXIN (tranquilizer) and a barbiturate (sedative)





Raudixin acts in the area of the midbrain and diencephalon and does not depress the cerebral cortex, as can be seen in this electroencephalogram. Consequently, the tranquilizing effect of Raudixin is generally free of loss of alertness.



Because barbiturates and other sedatives depress the cerebral cortex, as indicated by this "spindling," the sedation is often accompanied by a reduction in mental alertness.

RAUDIXIN

SQUIBB WHOLE ROOT RAUWOLFIA SERPENTINA

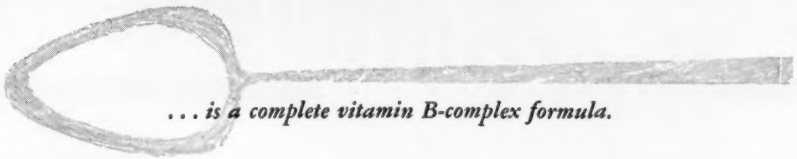
SQUIBB

DOSAGE: Usual initial dosage is 200 mg. daily. Maintenance dosage may be adjusted within a range of 50 mg. to 500 mg. daily, depending on the response observed and the possible appearance of side effects. Most patients can be adequately maintained on 100 mg. to 200 mg. per day. Because of its sustained action, Raudixin may be given in single daily doses if desired. *Note:* Tranquilizing action is usually evident in 3 to 10 days; for a more rapid onset of effect, the patient may be given a priming dose of 200 to 300 mg. twice daily for the first 3 days.

SUPPLY: 50 mg. and 100 mg. tablets, bottles of 100, 1000 and 5000.

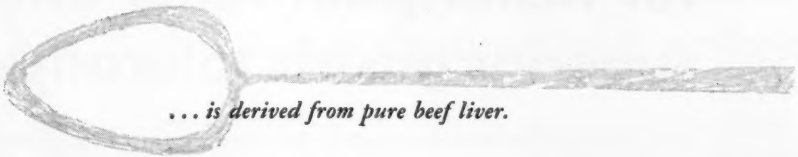
"RAUDIXIN"® IS A SQUIBB TRADEMARK.

LEDERPLEX LIQUID



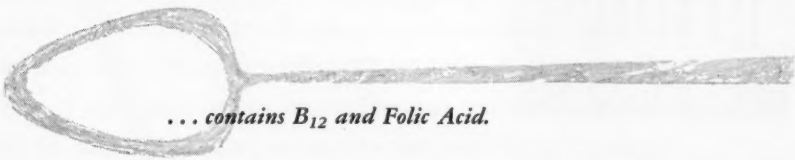
. . . is a complete vitamin B-complex formula.

LEDERPLEX LIQUID



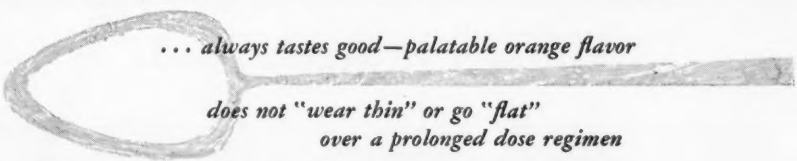
. . . is derived from pure beef liver.

LEDERPLEX LIQUID



. . . contains B_{12} and Folic Acid.

LEDERPLEX LIQUID



. . . always tastes good—palatable orange flavor

does not "wear thin" or go "flat"
over a prolonged dose regimen

LEDERPLEX* Vitamin B-Complex Liquid LEDERLE

Each teaspoonful (5 cc.) contains:

Thiamine HCl (B_1)	2 mg.	Pantothenic Acid	2 mg.
Riboflavin (B_2)	2 mg.	Choline	20 mg.
Niacinamide	10 mg.	Inositol	10 mg.
Folic Acid	0.2 mg.	Soluble Liver Fraction	470 mg.
Pyridoxine HCl (B_6)	0.2 mg.	Vitamin B_{12}	5 mcgm.

Also offered in Tablet, Capsule and Parenteral forms.

LEDERLE LABORATORIES DIVISION, AMERICAN CYANAMID COMPANY, PEARL RIVER, NEW YORK

*REG. U.S. PAT. OFF.

Lederle

Now Buffered

for faster pain relief and superior gastric tolerance

A nonsystemic buffer (aluminum hydroxide) has now been added — in a new *"sequential release"* tablet — to the formulae of Pabirin and Pabirin AC (Pabirin plus hydrocortisone). The outer layer of this specially constructed and rapidly disintegrating tablet contains the aluminum hydroxide, PABA, and ascorbic acid. Within a few minutes the buffering action of the aluminum hydroxide is made available to protect the stomach against possible irritation by the salicylate. Then the core of the tablet disintegrates to permit rapid absorption of the other antirheumatic ingredients. As a result, gastric tolerance is excellent — pain relief rapid.

	Buffered Pabirin Tablets	Buffered Pabirin AC Tablets (Pabirin plus hydrocortisone)
Hydrocortisone		2.5 mg.
Acetylsalicylic acid (5 gr.)	300 mg.	300 mg.
Para-aminobenzoic acid (5 gr.)	300 mg.	300 mg.
Ascorbic acid	50 mg.	50 mg.
Dried aluminum hydroxide gel	100 mg.	100 mg.

Buffered Pabirin Tablets and Buffered Pabirin AC Tablets are DORSEY *preparations.*

potentiated salicylate therapy in "sequential release" form

for most rheumatoid arthritics

Buffered Pabirin Tablets represent the safest, fast-acting potentiated salicylate therapy which utilizes the synergism of PABA and acetylsalicylic acid to create *rapid, high* and *sustained* salicylate blood levels with *low* salicylate dosage.

Dosage: Average dose in arthritis, gout, arthralgia—two or three tablets 3 or 4 times daily. In rheumatic fever, three to five tablets 4 or 5 times daily.

Supplied: In bottles of 100 and 500 tablets.

BUFFERED
Pabirin®
TABLETS

for resistant rheumatics

Buffered Pabirin AC (Pabirin plus hydrocortisone) Tablets. These new buffered tablets supply the extra steroid benefits of conservative amounts of hydrocortisone supplemented by the concurrent action of PABA, acetylsalicylic acid, and vitamin C. This combination creates high dosage steroid effects with low steroid dosage, thus minimizing the danger of adrenal atrophy.

Dosage: Initially one or two tablets 4 times daily after meals and before retiring. Dosage should be reduced gradually.

Supplied: In bottles of 50 and 250 tablets.

BUFFERED
Pabirin® AC
PABIRIN PLUS HYDROCORTISONE
TABLETS

SMITH-DORSEY • Lincoln, Nebraska • a division of The Wander Company

IN SENILE ANXIETY... PRONOUNCED IMPROVEMENT IN 51 OF 54

CLINICAL REPORT. New ATARAX calms tense patients without impairing mental alertness. Shalowitz tested ATARAX in 54 patients with senile anxiety. "Good to excellent improvement was shown in 51 of the 54 patients treated. No untoward effects on liver, blood or nervous system were observed. All patients treated, except those who responded poorly, (were) not as fidgety after therapy, and were able to sleep better."[1]

ADMINISTRATION. Although Shalowitz found the optimal dose was 10 mg. tablets three or four times a day, some patients may respond better on the 25 mg. tablets, b.i.d. or t.i.d. Now also available in syrup form, containing 10 mg. ATARAX per tsp. In tiny 10 mg. (orange) and 25 mg. (green) tablets, bottles of 100. ATARAX Syrup in pint bottles.

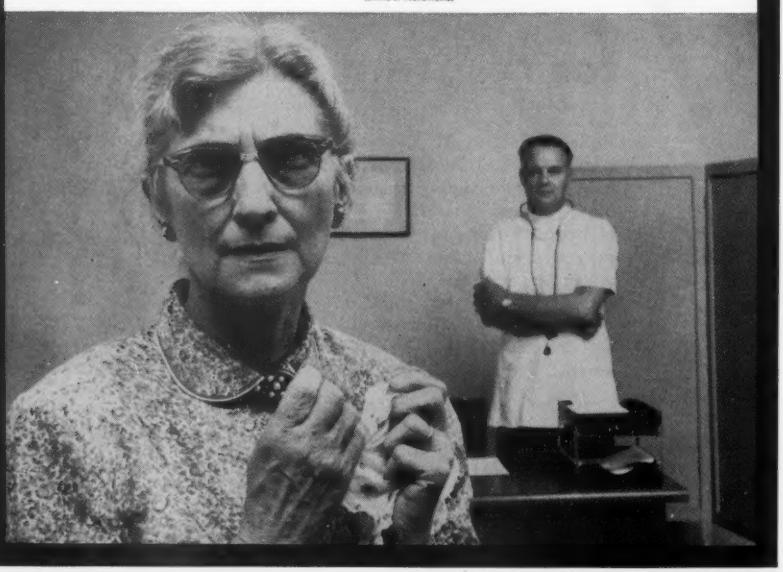
NOW IN CORDIAL-LIKE FORM

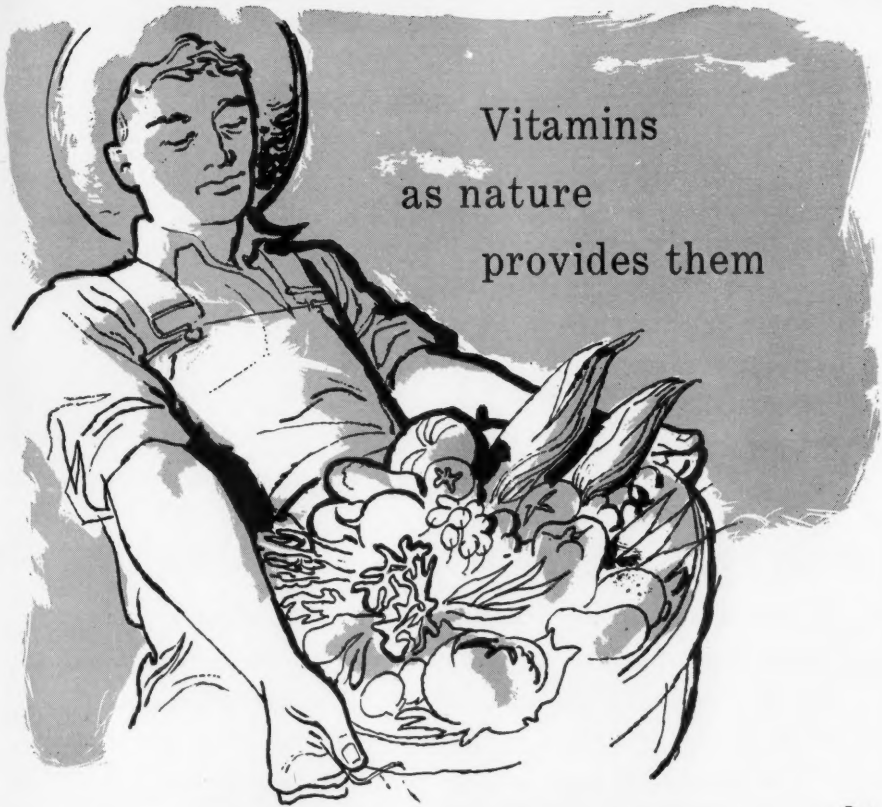
1. Shalowitz, M.: Hydroxyzine: a new therapeutic agent for senile anxiety states. Geriatrics 11:312 (July) 1956.

Roerig Chicago 11, Illinois

PEACE OF MIND ATARAX® SYRUP

(BRAND OF HYDROXYZINE)





HOMAGENETS®*

The homogenized vitamins

Homagenets supply vitamins in the same way as do the most nutritious foods. In this new dosage form, the vitamins are homogenized, then fused into a solid tablet. Because they are minutely subdivided, the vitamins are absorbed and utilized much more efficiently.

- *Better absorption, better utilization*
- *Excess vitamin dosage unnecessary*
- *Pleasant, candy-like flavor*
- *No regurgitation, no "fishy burp"*
- *May be chewed, swallowed or dissolved in the mouth*

Three formulas: Prenatal, Pediatric, Therapeutic

Samples available on request

*U.S. Pat. 2676136

THE S. E. MASSENGILL COMPANY • **Bristol, Tennessee** • **New York** • **Kansas City** • **San Francisco**

Effective local treatment

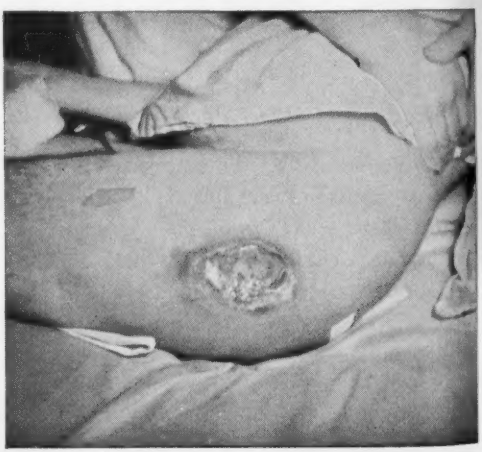
FOR BEDSORES AND OTHER CHRONIC ULCERATIONS

May 15th. Severe decubitus ulcer over femoral greater tuberosity in a terminally ill patient.

WHITE'S VITAMIN A & D OINTMENT

Routine application of White's Vitamin A & D Ointment promotes granulation and epithelization in *stubborn bedsores, chronic ulcers of varied etiology, burns and slow-healing wounds* that do not permit primary surgical closure. It is also useful as a protective and therapeutic covering in miscellaneous skin conditions characterized by abnormal dryness. White's Vitamin A & D Ointment provides vitamins A and D in a pleasant lanolin-petrolatum base that does not stain tissues or bed clothes.

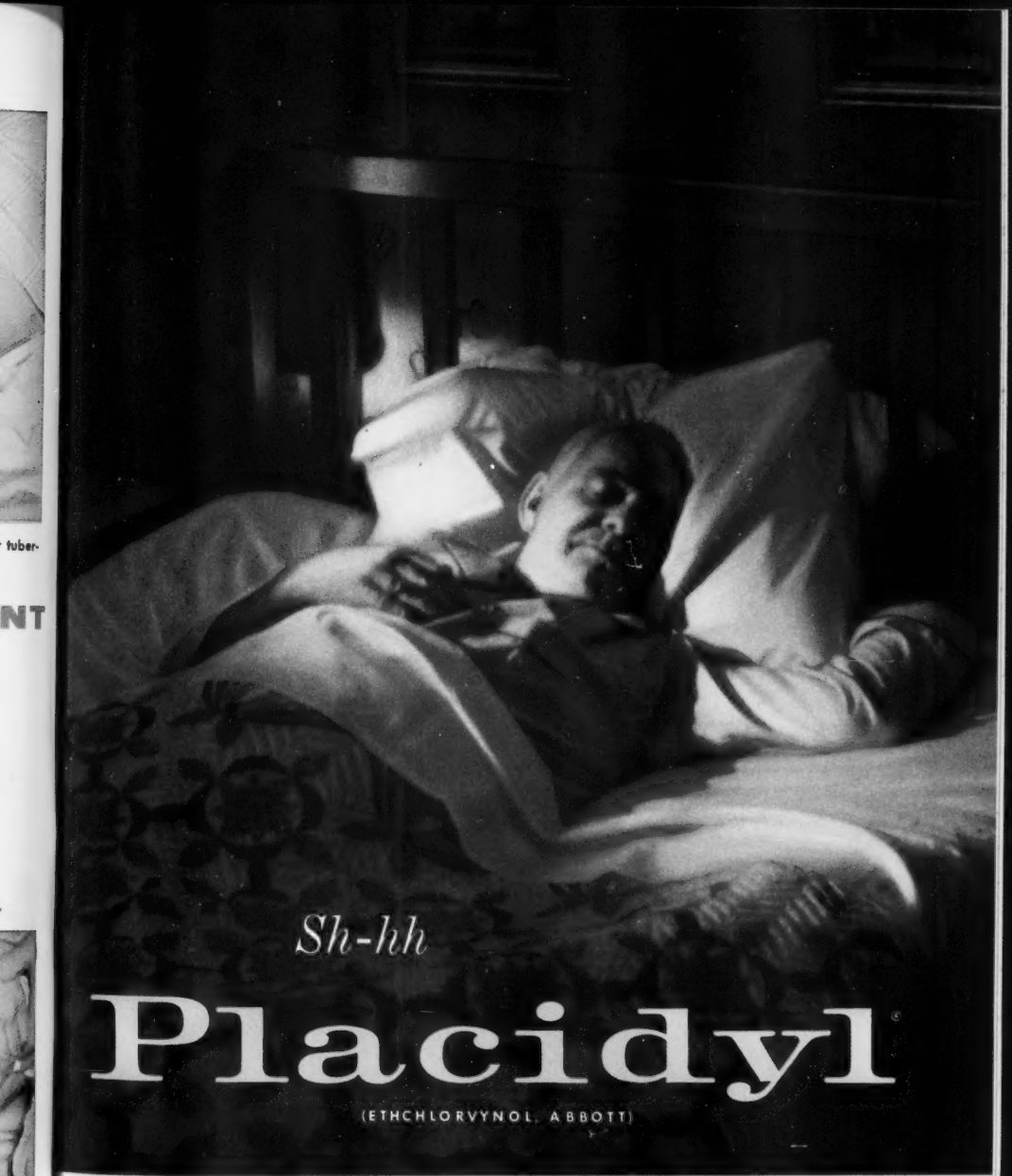
℞ in 1½ oz. or 4 oz. tubes; 1 lb. or 5 lb. jars.



July 12th. After 2 months of treatment with White's Vitamin A & D Ointment, ulcer crater reveals healthy granulation tissue

White's

WHITE LABORATORIES, INC., KENILWORTH, N. J.



Sh-hh

Placidyl

(ETHCHLORVYNOL, ABBOTT)

nudges your patient to sleep

One 500-mg. capsule of this new nonbarbiturate gently relieves ordinary nervous insomnia. Excellent in presence of mild anxiety or unrest, chronic disease, old age, and small hour waking. Abbott

Selsun®

...most effective treatment known for seborrheic dermatitis of the scalp and dandruff...

Your prescription for Selsun assures patients lasting relief from itching, scaling, burning scalps. And patients appreciate the ease of using Selsun: applies like a shampoo, rinses out easily, leaves both hair and scalp clean. Selsun Suspension completely controls 81-87% of seborrheic dermatitis, 92-95% of dandruff cases. Each 4-fluidounce bottle carries full directions.

Abbott

*Selenium Sulfide, Abbott

609022

PARKINSONISM

Artane*

HYDROCHLORIDE

Trihexyphenidyl HCl *Lederle*

effective over long periods

ARTANE is a strong antispasmodic, effective in all three types of Parkinsonism—Postencephalitic, Arteriosclerotic, and Idiopathic. Unlike certain other such drugs, it does not lose effectiveness when given over long periods. It is usually well tolerated, and has no deleterious effect on bone marrow function.

ARTANE is supplied in 2 mg. and 5 mg. tablets, and as an elixir containing 2 mg. per teaspoonful (4 cc.) Dosage: 1 mg. the first day, gradually increased, according to response, to 6 mg. to 10 mg. daily.

Lederle LEDERLE LABORATORIES DIVISION

AMERICAN Cyanamid COMPANY PEARL RIVER, NEW YORK

*REG. U.S. PAT. OFF.

A RESEARCH MILESTONE

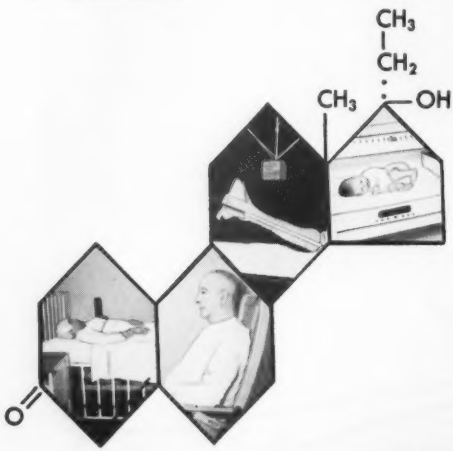
Nilevar*

(BRAND OF NORETHANDROLONE)

Searle's New and Practical Steroid Specifically for Protein Tissue Building—

It has long been recognized that a substance which would promote protein anabolism would be of inestimable value in therapy. The androgens have this property, but unfortunately they also exert actions on secondary sex characteristics. These effects are commonly undesirable in therapeutic programs.

THE FIRST STEROID WITH ANABOLIC SPECIFICITY—Nilevar, the newest Searle Research development, therefore, meets a long desired clinical need because Nilevar presents the first steroid primarily anabolic for protein synthesis. Moreover, Nilevar is without prominent androgenic effects (only about one-sixteenth of that exerted by the androgens).



OBJECTIVE AND SUBJECTIVE RESPONSE—Orally effective, Nilevar therapy is characterized by retention of nitrogen, potassium, phosphorus and other electrolytes in ratios indicative of protein anabolism. Moreover, subjectively the patient observes an increase in appetite and sense of well-being.

WELL TOLERATED—Nilevar has an extremely low toxicity. Laboratory animals fail to show toxic effects after six months of continuous administration of high dosages. Nilevar should not be administered to patients with prostatic carcinoma. Nausea or edema may be encountered infrequently. Slight androgenicity may be evidenced on high dosage or in particularly responsive individuals.

MAJOR INDICATIONS—Preparation for and recovery from surgery; supportive treatment of serious illnesses (pneumonia, poliomyelitis, carcinomatosis, tuberculosis); recovery from severe trauma and burns; decubitus ulcers; care of premature infants.

DOSAGE—The daily *adult* dose is three to five Nilevar tablets (30 to 50 mg.) but up to 100 mg. may be administered. For *children* the average daily dose is 1 to 1.5 mg. per kilogram of body weight; individual dosages depend on need and response to therapy.

SUPPLY—Nilevar is available in uncoated, unscored tablets of 10 mg. G. D. Searle & Co., Research in the Service of Medicine.

*Trademark of G. D. Searle & Co.

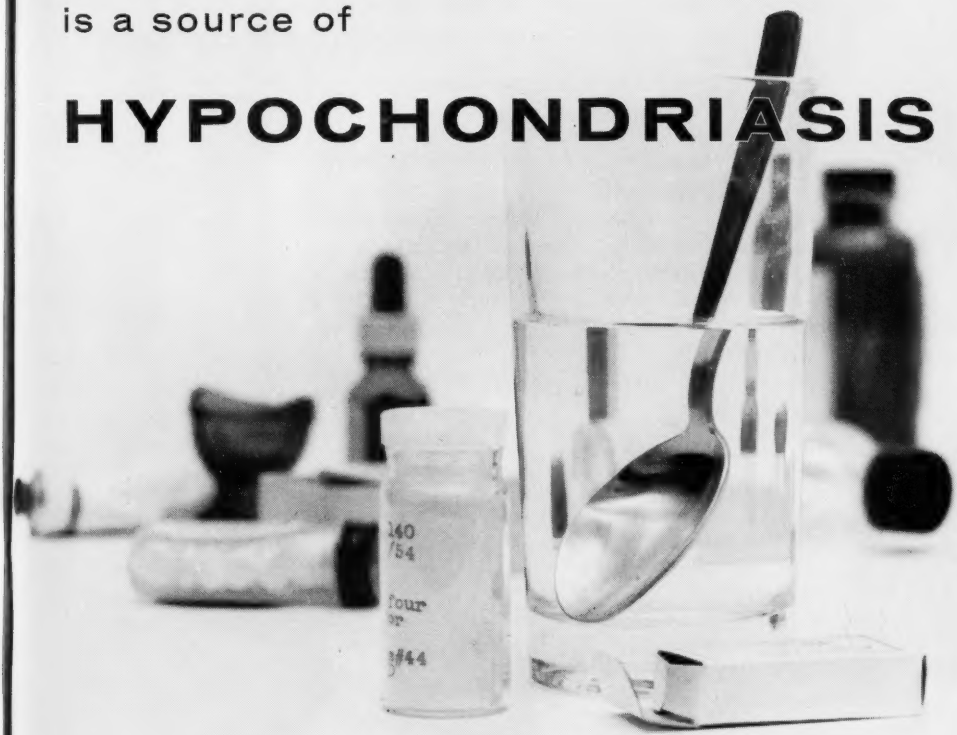
SEARLE

. . . part of *every illness*

ANXIETY

is a source of

HYPOCHONDRIASIS



Supplied: Tablets, 400 mg., bottles of 50.
Usual Dose: 1 tablet, t.i.d.

Wyeth®
Philadelphia 1, Pa.

anti-anxiety factor with muscle-relaxing action

Equanil®

MEPROBAMATE

(2-methyl-2-*n*-propyl-1,3-propanediol dicarbamate)

Licensed under U.S. Pat. No. 2,724,720

NEW

ATARAXOID is a unique, new combination of STERANE and ATARAX, which now permits simultaneous symptomatic control and reduction of attendant anxiety and apprehension in rheumatoid arthritis and other indications.

The added tranquilizer control, desirably easing mental stress, also directly assists clinical progress. It minimizes the chance of exacerbation related to emotional strain and facilitates patient confidence and cooperation in the therapeutic program toward maximum rehabilitation.

ATARAXOID exerts the anti-rheumatic, anti-inflammatory activity of STERANE distinctly superior to previous steroids, effective in radically reduced dosage, and with minimal disturbance of electrolyte and fluid metabolism.

The ataractic effect is a central neuro-relaxing action — the result of a marked cerebral specificity — free of mental fogging and devoid of any major complications: no liver, blood or brain damage. This peace-of-mind component is also used in the lowest dosage range.

Supplied: Each green, scored, ATARAXOID oral tablet contains 5 mg. prednisolone (STERANE) and 10 mg. hydroxyzine hydrochloride (ATARAX). Bottles of 30 and 100.

PFIZER LABORATORIES
Division, Chas. Pfizer & Co., Inc
Brooklyn 6, New York

Ata

the first and only ataraxic-corticoid

taraxoid*

prednisolone and hydroxyzine

Pfizer

combining the newest, safest tranquilizer, ATARAX® + the newest, most effective steroid, STERANE® (prednisolone)

simultaneously controls the symptoms and the apprehension

In Rheumatoid Arthritis, other collagen diseases, bronchial asthma and inflammatory dermatoses

*Trademark

has obvious advantages over desiccated thyroid...

Synthroid® sodium

(pure crystalline Sodium Levothyroxine) TABLETS

uniform composition[1-3]

constant potency[1-3]

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References: (1) Hart, F. D., and MacLagan, N. F.: Brit. M. J. 1:512 (Mar. 4) 1950. (2) Starr, P., and Liebhold-Schueck, R.: J.A.M.A. 155:732 (June 19) 1954. (3) Starr, P.: Postgrad. Med. 17:73, 1955.

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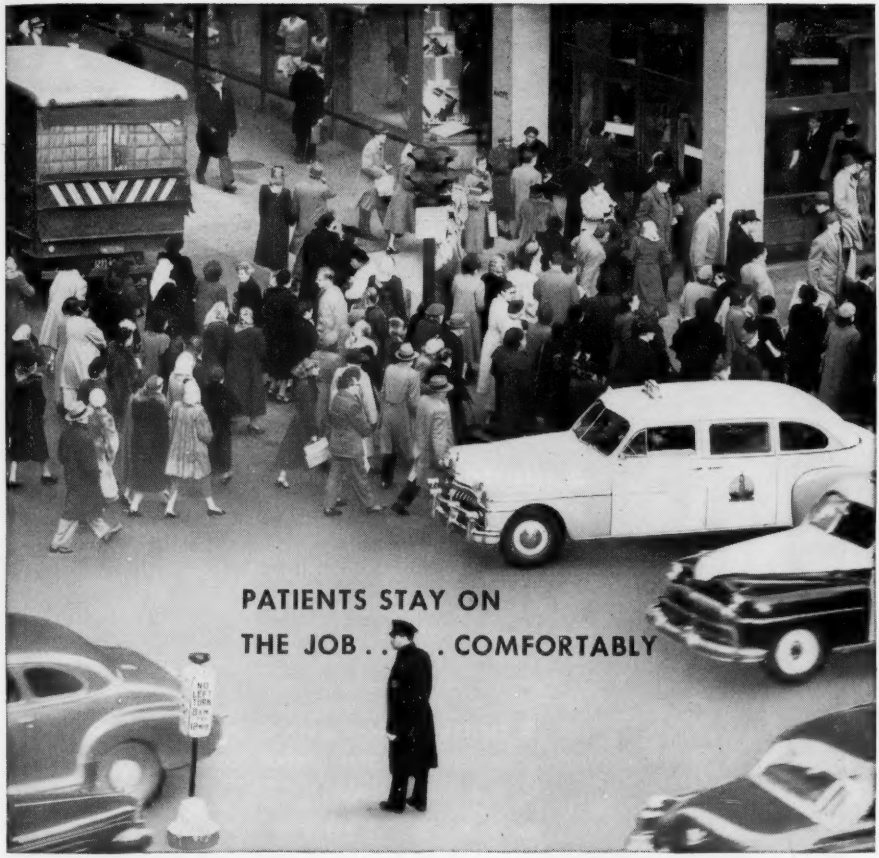

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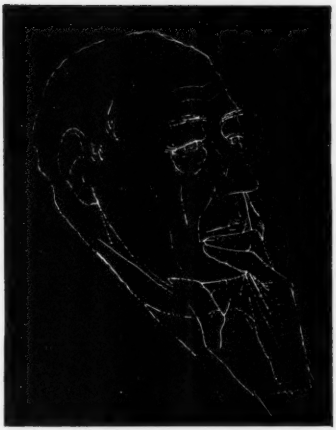

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HOW OLD IS OLD?

"The really old people are those 10 years older than myself."[1]

"In the lay mind, anyone past 60 is ready for the discard . . ."[2]

". . . there are only three principal phases in the span of life: infancy, adolescence and senescence."[3]

"One finds alert, interesting, active folks in the 80's and, on the other hand, there are people in the 20's and 30's who have all the characteristics of old age."[4]

THE REAL QUESTION

To the physician on the firing line of daily practice, the question of "how old is old?" seems academic. To him, a more valid question is "How can I allay the effects of the aging process?"

FIVE PROBLEMS IN AGING

The answer, according to most authorities, is manifold, for five treatable problems seem to predominate. One, obviously, is gonadal hormone decline. Another is mild anemia. A third is the decreased production of gastric and digestive enzymes. Mineral-vitamin deficiency is the fourth. And the fifth – perhaps most important – is inadequate high-quality protein intake.

THERAPY FOR AGING

Judging from this confused clinical picture of aging, therapy for the problem would appear difficult. However, most physicians agree that a product which could correct most or all of these five commonest problems would remove past obstacles to satisfactory response. Such a product would, essentially, be true "preventive geriatrics."

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* Protein deficiency among the aging apparently stems from their excessive intake of white-flour foods which furnish incomplete protein of low biologic value. White bread protein, for example, has been shown by nutrition studies in animals[5] to be deficient only in the amino acid, lysine. In human subjects metabolic determinations indicate that the addition of supplemental lysine to a basal white-flour protein diet can convert a negative nitrogen balance into a positive one.[6]

A WORD ABOUT SYMPTOMATOLOGY

In spite of jokes to the contrary, the patient who states in the professional office that "old age is creeping up" is a rare bird indeed.

Seldom is old age the presenting complaint. Thus the physician, after correcting the specific complaints, must re-evaluate the whole person to judge his candidacy for "preventive geriatrics." Such people have much to gain from NEOBON therapy. The rewards are fuller, more active, more pleasurable years for patients past 40. The daily dose (3 capsules) of NEOBON provides:

L-lysine	150 mg.
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Vitamin A (Palmitate)	6,000 U.S.P. Units
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Ethinyl Estradiol	1 mcg.
Methyltestosterone	1 mg.
Liver Fraction I	25 mg.
Ethyl Alcohol	0.5 cc.

Dosage: One teaspoonful twice daily before meals, or as required.

Supplied: In 16 fluid ounce bottles, prescription only.

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1. Anonymous. 2. Rosenthal, P.: Geriatrics 10:382 (August) 1955. 3. Lansing, A. I.: Symposium on Problems of Gerontology, National Symposium Series No. 9 (August) 1954. 4. Mason-Hohl, E.: Quoted in W. Va. Med. J. 51:16 (January) 1955. 5. Rosenberg, H. R., et al.: Arch. Biochem. and Biophys. 49:263, 1954. 6. Bricker, M., Mitchell, H. H. and Kinsman, G. M.: J. Nutrition 30:269, 1945. 7. Masters, W. H. and Ballew, J. W.: Geriatrics 10:1, 1 (January) 1955.

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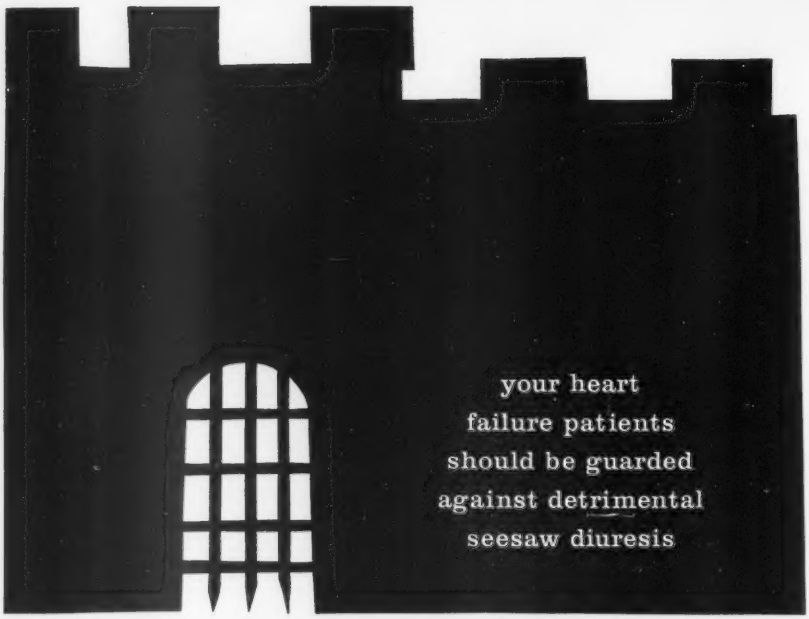

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Volume 11, Number 10 Geriatrics

Practical pointers on the differential diagnosis of lung diseases

ANDREW L. BANYAI, M.D.
MILWAUKEE, WISCONSIN

Modern methods provide efficient means for the identification of pulmonary diseases. Clinical findings should be evaluated with the patient's health and environmental history. In persons of advanced age, the physician should always keep in mind the possibility of bronchogenic carcinoma, hypertrophic emphysema, and lung changes resulting from heart failure or provoked by allergens.

◆ Problems in diagnosis and differential diagnosis of lung disease are encountered daily by the practicing physician. The lung is exposed to blood-borne infections like any other part of the body, and, in addition, is the only internal organ which is in direct contact with the outside atmosphere. The respiratory tract is an open passageway for pathogenic microorganisms from human sources as well as from many other possible foci.

Inhalation of allergens is a common cause of pulmonary disease. Atmospheric pollution from industry or other origin may cause pathologic changes in the lung. Moreover, pathogens may reach the lung through aspiration from the oral cavity and from the nasopharynx during unconscious states. Infection may spread to this organ from adjacent sites, as in cases of mediastinal or pleural suppuration or subdiaphragmatic abscess.

A number of cardiovascular diseases may lead to pulmonary manifestations, as seen in failure of the left ventricle, thromboembolism, arteriosclerosis in the pulmonary circuit, periarteritis nodosa, and others. Bronchospasm, pulmonary fibrosis, so-called hypertrophic emphysema, and congenital cystic disease of the lung, among others, may be hard to differentiate. In recent years, the tremendous increase in the incidence of bronchogenic carcinoma demands a constant awareness on the part of the physician.

Differential diagnosis is best solved by a systematic approach. Pertinent information is gained from the following sources: (1) the patient's complaints; (2) his past history and habits; (3) occupa-

ANDREW L. BANYAI *is associate clinical professor of medicine at Marquette University School of Medicine, Milwaukee.*

tional and environmental data; (4) findings on inspection, palpation, percussion, and auscultation; (5) x-ray examination; (6) laboratory findings; and (7) results of auxiliary diagnostic examinations.

The Patient's Complaints

After recording the patient's complaints, the physician should inquire about their characteristics so as to interpret them properly. For instance, certain types of cough may direct attention toward the most likely underlying disease.

COUGH

Cough is usually troublesome if the patient seeks treatment for its relief. Often it is chronic. Patients, the public, and the physician are habituated to cough. It is so common that it is accepted by a great many either as a habit or as an inevitable nuisance. Unfortunately, this frequently results in neglecting the prompt treatment of the disease which causes it.

The cough reflex is mediated through the glossopharyngeal and the vagus nerves. The physician should be aware of the vast area innervated by these two nerves. The provocative disease may be located in the upper respiratory tract or the lung as well as in the pleura, the mediastinum, and occasionally in the diaphragm and organs below the diaphragm. Although it is not frequent, the psychogenic cough should be kept in mind. The latter may occur independently of psychogenic hyperventilation syndrome.

In men over 50, the possibility of bronchogenic carcinoma should be seriously considered, for cough is its most frequent symptom, occurring in 75 to 90 per cent of cases. Usually, it is an early symptom. The character of cough is hard, stubborn, hacking, unproductive, paroxysmal, persistent, or spasmodic in the early stages of the disease. It may interfere with the patient's sleep. The severity of cough is not proportionate to the size of the neoplasm. Often, the patient will remark that the pattern of his "cigarette cough" has changed for the worse. In other instances, he may relate that he has had repeated "colds" at frequent intervals. He may complain of having "bronchitis" or "flu" which hangs on.

Cough caused by bronchogenic carcinoma becomes more and more troublesome and the physician finds that it is difficult to control with standard doses of cough sedatives. The presence of carcinoma in the bronchus may cause a reflex stimulation of the mucosal glands, leading to scanty, mucoid, or watery expectoration. With the increasing size of the tumor, bronchial occlusion may develop, with resulting infection in areas of the lung distal to the neoplasm. From this point on, the severity and type of cough are determined by the extent and character of secondary inflammatory changes in the bronchi or in the lung parenchyma.

Soon after the appearance of infection in the lung, cough becomes productive of varying amounts of mucoid, mucopurulent, or purulent sputum. The latter may be identical in appearance with that found in bronchiectasis or in lung abscess, conditions which are possible complications of bronchogenic carcinoma. It may be well to emphasize that, in all persons of middle age or older, every case of chronic unresolved pneumonia, "recurrent bronchitis," bronchiectasis, and lung abscess should be investigated for underlying carcinoma.

Some patients say that their cough is more pronounced on changing from erect to supine position or when they bend over. This should bring to mind bronchiectasis, infected congenital lung cysts, lung abscess, dermoid tumor, echinococcus cyst and bronchopleural fistula. Also, cough may be induced by spilling over of stagnating food particles or exudate from the esophagus in cases of cardiospasm and diverticulum of the esophagus.

In instances in which cough is more pronounced at night, the following possibilities should be checked: (1) failure of the right ventricle associated with edema of the lower extremities, (2) benign and malignant tumors of the lung and mediastinum, (3) enlargement of mediastinal lymph nodes, (4) allergic bronchitis, and (5) bronchial asthma. In the first mentioned type of heart disease, the lung is bound to become water logged while the patient is in bed during the night hours.

Paroxysmal fits of cough may be observed in pulmonary edema, asthmatic bronchitis, bronchial asthma, severe bronchitis, following aspiration of foreign bodies, or in connection with intrabronchial migration of broncholiths. Also, cough of this type may be associated with the perforation into a bronchus of an infected lung cyst (congenital, parasitic, or neoplastic), empyema, and mediastinal or subdiaphragmatic abscess.

Allergic cough is periodic or perennial. The so-called winter cough may signify bronchiolitis or bronchospasm. Cough on swallowing may be seen in persons with developmental anomalies in the oropharynx; or with esophagotracheal and esophagobronchial fistulas; or with a sensory or motor dysfunction of the laryngeal nerves. Increase in cough after meals is a common occurrence in chronic lung diseases. It is attributable to stimulation of the gastric nerve endings of the vagus, which, through a reflex arc, stimulates the mucosal glands of the bronchi.

Bronchospasm is a potent, though less known, cause of cough. Awareness of this condition is prerequisite to its satisfactory management. In addition to allergens, irritating fumes, gases, and dusts, bronchospasm may be provoked by any bronchopulmonary infection, fibrosis, congestion, emphysema, foreign body, broncholith, undue exposure to cold, and by cigarette smoking.

TABLE 1
CONDITIONS SUGGESTED BY PULMONARY HEMORRHAGE

- *Bronchopulmonary infections, tumors, and their sequels*
  - Pulmonary tuberculosis
  - Pulmonary infection other than tuberculosis
  - Bronchiectasis
  - Severe bronchitis
  - Benign or malignant tumors
  - Lung abscess
  - Bronchial ulcer
  - Bronchial varicosities
  - Broncholiths
  - Infestation with animal parasites
- *Congenital pulmonary malformations and anomalies*
  - Cystic disease of the lung
  - Pulmonary arteriovenous fistula
  - Hereditary hemorrhagic telangiectasia
  - Increased capillary fragility
- *Cardiovascular diseases*
  - Pulmonary infarction
  - Myocardial failure with pulmonary congestion
  - Sclerosis of the pulmonary artery
  - Hypertension
  - Perforating aneurysm
  - Mitral stenosis
- *Miscellaneous changes*
  - Thoracic trauma
  - Aspirated foreign body
  - Blood dyscrasias
  - Perforation of abscess or tumor of adjacent organs or structures
  - Pulmonary manifestations of systemic diseases

PULMONARY HEMORRHAGE

When a patient of middle age or older is seen with pulmonary hemorrhage, first thought should be given to carcinoma as the possible cause. Such an assumption is omitted only in instances in which there is direct or indirect proof of some other disease. Conditions which may result in hemorrhage from the lung are given in table 1.

WHEEZING

Patients who complain of wheezing should not be peremptorily diagnosed as having bronchial asthma. The axiom of

TABLE 2

CONDITIONS SUGGESTED BY WHEEZING

- *Pulmonary diseases*
  - Bronchial asthma
  - Severe bronchitis
  - Bronchospasm
  - Fibrostenosis of bronchus
  - Bronchial tumors
  - Aspirated foreign body
  - Lung abscess
  - Broncholiths
  - Bronchiectasis
- *Obstructive diseases of the larynx*
  - Tumor
  - Vocal cord paralysis
  - Edema
  - Fibrostenosis
  - Foreign body
- *Tumors of the trachea*
- *Tracheal compression*
  - Enlarged thyroid
  - Mediastinal tumors
  - Mediastinitis
  - Pneumomediastinum
  - Carcinoma of the esophagus
  - Foreign body in esophagus
  - Enlarged mediastinal lymph nodes
  - Aneurysm

Jackson, "not all that wheezes is asthma," should serve as a constant motto in the differential diagnosis of such cases. When this symptom is encountered in adults, there are a number of possibilities which must be evaluated. These are shown in table 2.

PAIN IN THE CHEST

Pain in the chest is noted in a variety of gradations and forms. Its type and modality are predicated upon the underlying causal changes and the degree of sensibility of the patient. Often, it is one of the most pressing problems which requires immediate attention. The grouping of possible sources of chest pain as shown in table 3 may serve as a guide in differential diagnosis.

Physical Examination

In the maze of differential diagnostic possibilities, one should follow a selective orientation according to the patient's history and the findings on examination. On inspection, the physician should observe presence or absence of cyanosis, shape and mobility of the chest, and noticeable inspiratory descent of the diaphragm. It is well to look for Horner's syndrome (enophthalmos, ptosis, miosis, and dryness of one cheek), which is likely to signify neoplastic involvement of the cervical sympathetic chain. One should search for lymph node enlargement secondary to metastasis or to some systemic disease, such as tuberculosis, sarcoidosis, Hodgkin's disease, leukemia, and others. Draining skin lesions may suggest actinomycosis, blastomycosis, or tuberculosis. Clubbing of the fingers, hippocratic incurvation of the fingernails, and disappearance of the lunulae from the nails may be observed in localized as well as in widespread lung disease. Hypertrophic osteoarthropathy may precede by several months the onset of pulmonary symptoms. The stethoscope is an invaluable instrument in differential diagnosis, provided auditory perception is kept acute by diligent practice.

X-ray Examination

Proper interpretation of x-ray findings on fluoroscopic or roentgenographic examination is an essential part of assaying a chest condition. Findings may be characteristic, as in cases of spontaneous pneumothorax, massive atelectasis, or so-called hypertrophic emphysema. In other instances, the pattern of x-ray shadows is irregular, bizarre, or may resemble geometric designs, with a spherical, ringlike, or triangular appearance.

Auxiliary Diagnostic Procedures

Correct differential diagnosis is a composite task. Pertinent data gained through questioning, observing, and examining

TABLE 3

CONDITIONS SUGGESTED BY PAIN IN THE CHEST

- *Involvement of the pleura*
  - Infection (with or without effusion)
  - Spontaneous pneumothorax
  - Hydropneumothorax
  - Hemopneumothorax
  - Chylothorax
- *Diseases of the lung*
  - Parenchymal and interstitial infection
  - Bronchial infection
  - Infarction
  - Neoplasm
  - Silicosis and other pneumoconioses
  - Foreign body
  - Broncholith
  - Bronchospasm
  - Atelectasis
  - Congestion
  - Arteriovenous fistula
  - Interstitial emphysema
  - Air embolism
- *Diseases of the heart and large blood vessels*
  - Coronary artery disease
  - Mitral stenosis
  - Aortic stenosis
  - Myocarditis
  - Pericarditis
  - Aortitis
  - Aneurysm
  - Dissecting aneurysm
  - Ruptured aneurysm
  - Coarctation
  - Hypertension { Systemic / Pulmonary
  - Neurocirculatory asthenia
  - Abuse of nicotine and coffee
- *Diseases of the mediastinum*
  - Mediastinitis
  - Enlarged lymph nodes
  - Tumor
  - Goiter
  - Cyst
  - Hernia
  - Perforation of the esophagus
  - Pneumomediastinum
- *Diseases of the esophagus*
  - Esophagitis
  - Tumor
  - Foreign body
  - Rupture
  - Diverticulum
  - Stricture
  - Megaesophagus
  - Spasm
- *Diseases of the chest wall*
  - Myositis
  - Fibrositis
  - Affections of interspinous ligaments
  - Osteomyelitis
  - Periostitis
  - Tumors
  - Fractures
  - Herniation of the intervertebral disk
  - Spinal arthritis
  - Tietze's syndrome
  - Slipped costal cartilage
  - Involvement of intercostal lymph nodes
  - Herpes zoster
  - Mastitis
  - Muscular imbalance
  - Spinal radiculitis
  - Trauma
  - Bronchopleural fistula
- *Diseases of the diaphragm*
  - Hiatus hernia
  - Diaphragmitis
  - Tumor
- *Abdominal diseases with pain referred to the chest*
  - Gall bladder
  - Gastritis
  - Gastric ulcer
  - Perigastritis
  - Periduodenitis
  - Aerophagia with gastric distention
  - Distention of splenic flexure
  - Pylorus spasm
  - Gastric ptosis
  - Appendicitis
- *Miscellaneous causes*
  - Hyperthyroidism
  - Hypothyroidism
  - Pernicious anemia
  - Severe secondary anemia
  - Cranial nerve tumor
  - Basal skull tumor
  - Tumor of spinal cord and nerves
  - Supranumerary cervical rib
  - Carotid sinus syndrome
  - Scalenus anticus syndrome
  - Tabes dorsalis
  - Epilepsy equivalent
  - Epidemic pleurodynia (Bornholm disease)
  - Lead poisoning
  - Hypoglycemia
  - Thiamine chloride deficiency
  - Pronounced tetany
  - Hyperventilation syndrome
  - Male climacteric
  - Psychogenic

the patient are to be critically assayed, coordinated, and interpreted. Auxiliary procedures may be necessary to clarify the problem. These include bronchoscopic examination, exploratory thoracocentesis, biopsy of enlarged lymph nodes, scalene "fat pad" biopsy, and histologic examination of fistulas of the chest and obscure skin lesions. Moreover, when circumstances require, one should resort to barium suspension for outlining the esophagus for morphologic and functional studies as well as for ascertaining its relation to other thoracic structures. It may be expedient to do complete cardiologic examination; cardiorespiratory function tests; and special x-ray studies, such as bronchograms,

tomograms, kymograms, and roentgenograms taken in lateral, oblique, and lordotic positions. Exploratory thoracotomy entails less postoperative invalidism than exploratory laparotomy.

Laboratory Examinations

Laboratory examinations are indispensable for accurate diagnosis. The physician should avail himself of microbiologic examination of the sputum. Aerobic and anerobic culture methods are used for isolation of bacterial agents. Search should be made for trophozoites of Endamoeba histolytica and for ova of parasites. When there is reasonable suspicion of pulmonary infection and the patient is unable to produce a satisfactory sputum specimen, fasting gastric contents should be secured for such examination on three consecutive days.

Examination of the sputum or material aspirated through the bronchoscope for malignant cells may confirm the diagnosis of bronchogenic carcinoma. Cytologic examination of the sputum should be carried out in older individuals with obscure lung disease as routinely as the search for tubercle bacilli is done in patients suspected of having tuberculosis. Furthermore, cytologic examination may reveal "heart failure cells" in cases of pulmonary congestion and edema, and large number of eosinophilic cells in cases of Loeffler's syndrome, bronchial asthma, and allergic bronchitis. Large number of oil-laden macrophages may be discovered in lipoid pneumonia.

Skin tests and serologic and hematologic studies are of great value in differential diagnosis. They may offer corroboration of or may rule out diseases which present no other distinguishing findings.

OLDER PERSONS can learn things learnable at a younger age if allowed to utilize judgment in reducing speed to increase accuracy or in transferring knowledge from old to new skills. The differences in the amount and quality of learning will depend upon the time devoted to study, although a decrement in speed and sensory acuity may be a concomitant of aging. Intelligence tests given to both young people and mature adults alike fail to consider the increasing amount of formal education in successive generations. The median of years of schooling completed in the age group 25 to 29 is 12.1 years; 35 to 44, 10.2 years; and 65 years and older, 8.2 years. Intelligence and ability to learn are sufficiently related to suggest that intellect and performance are maintained without much decrement through early and middle maturity.

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Photoelectric plethysmography

Methods, normal standards, and clinical application

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Photoelectric plethysmography of the digital pulse is a simple, accurate, and objective method, well suited for clinical application in the diagnosis of peripheral arteriosclerotic degeneration. An excellent differentiation between normal and abnormal was obtained in three items of contour analysis. Reactive hyperemia was diminished or abolished in patients with peripheral vascular disease, which added to the diagnostic differentiation. Impedance plethysmography also holds promise for further study of peripheral circulation.

◆ Impairment of peripheral circulation as a result of progressive arteriosclerotic degeneration is quite common in older patients. The usual diagnostic methods, such as measurements of skin temperature, functional impairment, clinical signs of locally disturbed circulation, and subjective rating of the patients, are too crude to detect early disturbance of peripheral circulation, or to evaluate objectively trends of deterioration or improvement, unless they are quite pronounced.

There is obviously a need for a simple, accurate, and objective method for the measurement of peripheral circulation. Any clinical application should be based on a statistical analysis of a large amount of normal material, but, prior to our studies,[1] no adequate normal standards were available, despite the extensive literature on digital circulation, recently reviewed by Mendlowitz.[2]

Three types of methods have been developed: volume plethysmography, caloric plethysmography, and photoelectric recording of the changes in transparency. Volume and caloric plethysmography permit the determination of the peripheral blood flow in cubic centimeters per unit of time and tissue. This is very pertinent information to characterize the state of peripheral circulation, but these methods are somewhat too time-consuming for clinical routine, particularly in the office of the practitioner.

The easiest method in application is photoelectric plethysmography, which was introduced almost simultaneously by Hertzman[3] in the United States and Matthes[4] in Germany. Since the advantage of this method consists mainly in the inertia-free recording of the pulse wave, its logical application would be a quantitative contour analysis. Hertzman and associates found good correlations between mechanical, calorimetric, and photoelectric plethysmography.[5]

The "crest time"—that is, the interval from foot point to peak—was measured

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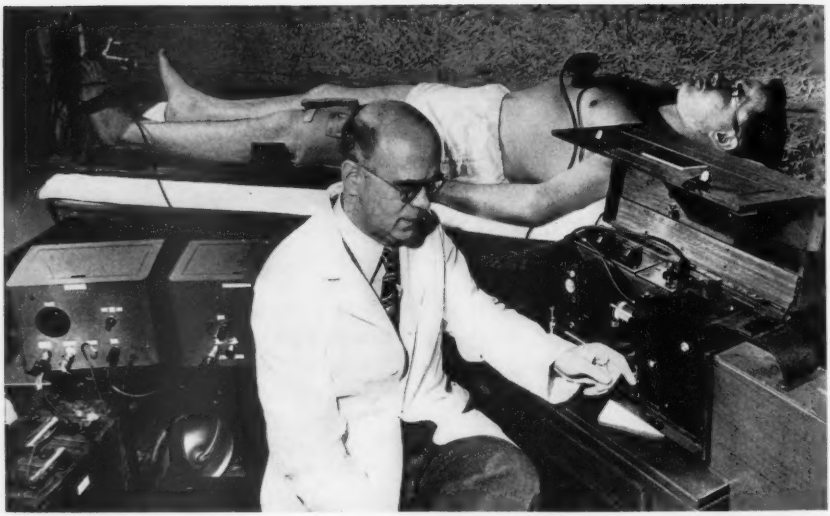

FIG. I. *General arrangement for photoelectric recording of the toe pulse. For description see text.*

by Dillon and Hertzman[6], but the falling phase of the pulse curve was not studied in detail. However, differences in the rising and falling phase of the pulse were demonstrated in a few representative normal and abnormal cases.[6-8]

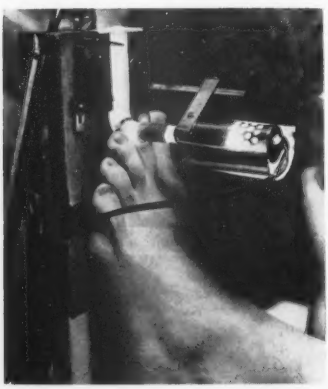

FIG. II. *Adjustment of foot position for recording of the photoelectric plethysmogram from the second toe, which rests on the opening in the board for the photo cell.*

Since the differentiation between normal and abnormal conditions is usually better in physiologic stress than at rest, we studied the toe pulse both at rest and during reactive hyperemia. Although the literature about reactive hyperemia is large,[9,2,7] no analysis of an adequate normal material of photoelectrically recorded toe pulse changes has yet been reported prior to our study.

Equipment and Procedure

Photoelectric recording of the digital volume pulse has been used since 1934[4] and no detailed description is needed. A capacity-coupled amplifier was used in connection with a photocell and a string galvanometer (Cambridge "Simplitrol"). The toe pulse was recorded in the supine position with the foot resting on a support with attached photocell and lamp (figures I and II). Most of the tracings were taken with a speed of 25 mm./sec., but occasionally a speed of 50 mm./sec. was used.

The experiments were performed in

an air-conditioned room at a temperature of 78° F. The subjects were in the basal state and rested for about thirty minutes before the test was started.

A blood pressure cuff was placed around the upper leg and inflated to 200 mm. Hg pressure (or more in patients with arterial hypertension) for five minutes. Tracings were taken before inflation for control study, and ten seconds, thirty seconds, one minute, two minutes, and five minutes after release for study of reactive hyperemia. The blood pressure was determined nearly simultaneously. For normal subjects and for most patients with arterial hypertension, the measurements were made on one leg, but in patients with peripheral vascular disease, both legs were used for comparison.

The general arrangement and procedure for measuring the toe pulse are shown in figure I. The foot is placed on a heel rest and mounted on a board. The photocell is behind the board and not visible except for the upper end. The metal casing houses the lamp. A stethoscope is placed over the heart, and a rubber cuff around the upper left leg. Two amplifiers are shown at the left side, but only one is connected for clearer demonstration. The set-up for recording of the toe pulse from the other leg is identical, and a switch is provided for alternate recording. The capacity-coupled amplifier was used in connection with the photocell and a string galvanometer (Cambridge "Simplitrol"), but equally good records have been obtained with a direct writing electrocardiograph (Sanborn Cardiette), without any change of the amplifier. The amplifier provides three stages of amplification, dependent on the amplitude obtainable.

The toe pulse was recorded in the supine position, with the foot carefully adjusted as shown in the close-up of figure II. The lamp (a 6-volt parking light lamp) is housed in a copper cylinder. The heat radiation was eliminated by a cylindrical piece of lucite placed between lamp and toe. Through a directional effect, this increased the output by 25 per cent. The board with attached foot can be slid up or down and is held in the desired position by means of a setscrew, with the toe resting on the opening for the photocell. Then the lamp with the lucite piece is brought into contact with the toe moving the lamp along the rod; the contact should be light, avoiding any pressure. In figures I and II, the pulse is recorded from the second toe, which was used most frequently in the normal series. However, the pulse from other toes, as well as from fingers, was also frequently recorded.

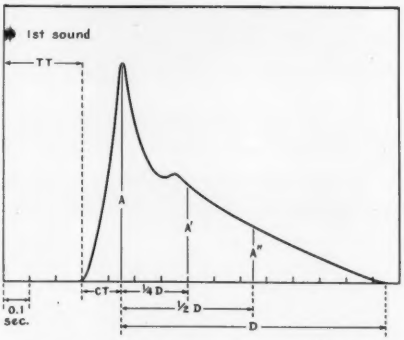

FIG. III. *Schematic diagram of a typical digital pulse curve and the measurements for evaluation of contour characteristics. CT = Crest time, D = total diastolic distance, divided into ¼ D and ½ D, A = peak amplitude, A' and A'' = amplitudes at ¼ and ½ D, in per cent of A. TT = transmission time from first heart sound to foot point of pulse curve; total cycle length = CT + D.*

Measurement and Evaluation

A schematic diagram of a typical normal pulse curve, together with the measurement of the various segments, is shown in figure III. The crest time (CT) is measured from the foot point of the rising limb to the time of the peak of the maximum amplitude A, which di-

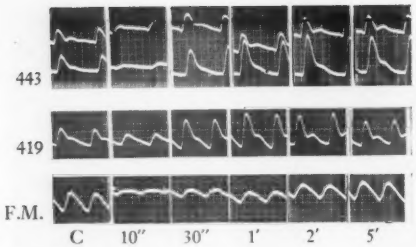

FIG. IV. *Photoelectrically recorded toe pulse in two normal middle-aged men (No. 443 and lower tracing, No. 419), and in a patient with Buerger's disease (F.M.), before (control, C) and at various time intervals (10 sec. to 5 min.) after five minutes occlusion of the femoral artery (reactive hyperemia). The upper (dark) tracing in subject No. 443 is a record of the heart sounds, and the middle tracing is a pneumographic record of the arterial dorsalis pedis. The amplitude immediately after occlusion (10 sec.) is smaller than that in the control period C, increases in the two normal subjects to a maximum at one minute (No. 419) and two minutes (No. 443) of reactive hyperemia, while in the patient (F.M.) the increase is slower and does not exceed the initial amplitude (C). (Reproduced from Simonson et al.[1])*

vides the systole CT from the diastole D. The crest time CT is expressed in absolute values as well as in per cent of the cycle length CT + D ("relative crest time"). For measurement of the slope of the descending limb, the distance D from the peak to the foot point of the following beat was divided into four equal segments. The amplitude at one-fourth and at one-half of the total diastolic distance D was measured and expressed in per cent of the peak amplitude A.

In reactive hyperemia, the change of the peak amplitude was expressed as a percentage of the peak amplitude in the control period. Although the change of the amplitude in the intervals after pressure release is the main criterion for reactive hyperemia, the pulse contour analysis, as described previously, was made for each of these intervals—ten seconds, thirty seconds, one minute, two minutes, and five minutes.

Subjects

Two normal groups were studied. The first group (Y) consisted of 170 young men between 18 and 27, the second group (O) of 270 middle-aged men between 45 and 54. The number of experimental subjects, however, varied slightly in the various items. A thorough clinical examination, which included x-ray study, electrocardiography, blood cholesterol, specific gravity (fat content), and the response to various physiologic stresses failed to reveal any evidence of disease. The repeat variability was determined in another group of 26 normal men from 20 to 30 years of age. A total of 57 patients with arterial hypertension was studied – group H, with 15 under 40 years of age. A total of 35 older patients with peripheral vascular disease (group PVD), caused, in most cases, by arteriosclerosis, was also studied. Six items were measured in each tracing, and six tracings were obtained for each subject.

Reactive Hyperemia

Typical examples of reactive hyperemia in two normal older men (cases 443 and 419) are shown in figure IV. Immediately after release the amplitude is definitely smaller than before occlusion, but at thirty seconds exceeds the initial amplitude and increases further, reaching maximum increase in two minutes in case 443, and in one minute in case 419. The mechanically recorded pulse curve of the dorsalis pedis artery (upper tracing, case 443) shows also the decrease of amplitude immediately after the release, together with a flattening of the contour during that period. The dicrotic notch disappears, and the contour is similar to that in patients with peripheral vascular disease (F. M.).

It is of interest that the initial decrease has escaped notice in volumetric[9] or calorimetric[10] plethysmography. This may be caused by arterial constriction, possibly on the basis of a reflex mechan-

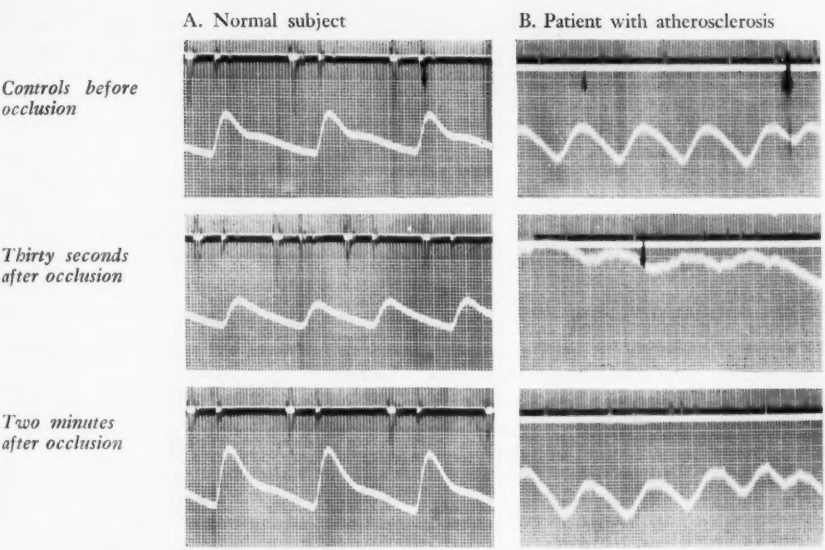

FIG. V. *Response to occlusion.* A. *Typical normal pulse tracing and reactive hyperemia (lower curve), together with heart sound record (upper tracing).* B. *Abnormal pulse tracing in an older patient with peripheral arteriosclerosis, and absent reactive hyperemia after arterial occlusion.*

ism. In figure IV, F. M. shows, by comparison, the typical response of a patient with peripheral vascular disease (Buerger's disease). In the control period, the crest time is prolonged, and the decline in diastole is slower. The dicrotic notch is absent. After release of the arterial occlusion, the initial period of relative ischemia is prolonged, and the following reactive hyperemia does not exceed significantly the amplitude in the control period (C).

Figure V shows another example of a normal, middle-aged subject and that of a patient with peripheral arteriosclerosis. The normal subject shows the typical initial decrease of the amplitude thirty seconds after release, together with the loss of the dicrotic notch, and two minutes later the increase of amplitude, exceeding significantly the initial amplitude in the control period. The deformation of the pulse curve in the control period, and the failure to react with a reactive hyperemia, in the patient with arteriosclerosis is quite similar to that of the patient with Buerger's disease, shown in figure IV. We have found consistently that the deformation of pulse contour and the decrease or abolishment of reactive hyperemia depends on the actual impairment of peripheral circulation and not on the type of pathology.

In the patients in figure IV and in that of V, the impairment is quite severe, but by no means extreme. In patients with more advanced involvement, the contour in the control period is similar to that of F.M. in figure IV, thirty seconds after release of occlusion. In patients with extreme involvement, no pulsation at all can be obtained, even at the greatest amplification.

There was no initial drop of the amplitude in the hypertensive group H; reactive hyperemia started immediately after the release, and this difference to the normal response was highly significant.

TABLE 1

MAXIMUM INCREASE OF AMPLITUDE DURING REACTIVE HYPEREMIA*

Group	Mean	S.D.	t	p
Y	274	102		
O	281	111		
H	225	109	3.36	.001
PVD	160	75	6.14	.001

*Maximum increase of amplitude (in per cent of amplitude before occlusion) during reactive hyperemia in 170 young men (Y), 283 old men (O), 55 patients with hypertension (H) and 34 patients with peripheral vascular disease (PVD) and statistical significance of the differences of groups Y, H and PVD vs. group O (t-test).

In the later periods (one to five minutes) the reactive hyperemia was significantly smaller and this difference was also highly significant statistically.

In the group of patients with peripheral vascular disease (PVD), the initial drop was deeper and more prolonged, and the level of reactive hyperemia was much lower during the total duration of five minutes. The difference between groups O (older normal men) and PVD was highly significant throughout the whole course of reactive hyperemia so far as measured. In the more advanced cases, reactive hyperemia was entirely absent.

The time of the maximum increase during the reactive hyperemia varied widely in groups O, Y, and H.

Table 1 shows the maximum increase during reactive hyperemia independent of the time of occurrence. There was no significant age difference between the normal groups Y and O, but the maximum was significantly lower in patients with hypertension (H) and particularly in patients with peripheral vascular disease (PVD). The maximum in-

TABLE 2

MEANS AND STANDARD DEVIATIONS OF ABSOLUTE CREST TIME, RELATIVE CREST TIME, AND RELATIVE AMPLITUDES AT TWO POINTS DURING DIASTOLIC PHASE*

	Crest time				Relative amplitude (per cent peak ampl.)			
	Absolute (1/100 sec.)		Relative (per cent cycle)		¼ diast.		½ diast.	
Group	M	S.D.	M	S.D.	M	S.D.	M	S.D.
Y	13.8	2.3	14.2	3.2	36.8	17.0	23.2	14.2
O	14.9	2.4	15.8	2.9	45.4	6.4	27.4	10.3
H	15.0	3.4	16.6	4.0	52.4	17.1	31.2	12.9
PVD	23.0	5.6	26.4	5.5	79.7	13.2	52.3	18.3
	Statistical significance							
	t	p	t	p	t	p	t	p
Y vs. O	4.36	.0001	5.28	.0001	5.90	.0001	3.59	.001
H vs. O	0.22	n.s.	1.54	n.s.	3.14	.01	2.12	.05
PVD vs. O	15.08	.0001	17.27	.0001	13.91	.0001	11.39	.0001

*Means (M) and standard deviations (S.D.) of absolute crest time, relative crest time (per cent of cycle), relative amplitudes at ¼ and ½ distance of diastolic phase, of 159 young men (Y), 267 older men (O), 55 patients with arterial hypertension (H), and 34 patients with peripheral vascular disease (PVD). Statistical significance of mean differences between groups Y, H, and PVD vs. group O (t-test, p-level).

crease in a group of 22 patients with borderline hypertension (between 135/85 and 150/90 mm. Hg blood pressure) with a mean of 273 was not significantly different from group O.

Contour Analysis

The mean crest time, absolute and relative, was significantly longer and the diastolic decline was significantly slower in the older men than in the younger men, as shown in table 2.

The existence of normal age trends is important for diagnostic application and should be considered in the evaluation of individual patients.

The mean crest time was not significantly different between normal older men (O) and hypertensive patients (H), but the diastolic decline was significantly slower in the hypertensive patients, indicating some subclinical impairment of peripheral circulation.

However, the mean differences between the two normal age groups, or between the group of hypertensive patients and the older group, are small compared to the great delay of crest time and diastolic decline in the group of patients with peripheral vascular disease.

Normal Limits

For clinical diagnosis of individual patients, the upper normal limits as determined from the frequency distribution in our normal material, are more pertinent than the mean values. Experience has shown that normal limits, including 95 to 98 per cent of the normal population, are the most practical; limits which would include a higher percentage of normal population, would include too large a proportion of patients.

From the distribution, the following rounded normal limits for 95 per cent of the older male population were obtained: for the absolute crest time, 19/100 seconds; for relative crest time, 20.6 per cent; and for the relative amplitude at one-fourth diastolic distance, 64 per cent of the peak amplitude. These values are exceeded by 70.5, 88.5, and 88 per cent of the patients with peripheral vascular disease, respectively. The diagnostic differentiation between normal and abnormal by means of the relative crest time and the amplitude at one-fourth diastolic distance is excellent, and paralleled only by few diagnostic tests. By comparison, a greater overlap between 35 patients with thromboangitis obliterans and 24 normal subjects is shown by the means and standard deviations of these groups in Mendlowitz and Abel's results with calorimetrically determined digital blood flow.[11]

It is of interest that the limits of the absolute crest time of 19/100 seconds, and for relative amplitude at one-fourth distance of 64 per cent are exceeded by 20 per cent of patients with arterial hypertension, but without clinically diagnosed peripheral vascular disease, indicating the sensitivity of the method to detect early subclinical involvement. With the relative amplitude at one-half diastolic distance, the differentiation was poorer than with the amplitude at one-fourth diastolic distance, and therefore, this item was discarded for normal limits.

In regard to the reactive hyperemia, a normal limit of 120 per cent of maximum amplitude increase is suggested. This value is exceeded by 95 per cent of normal men (old or young), 85 per cent of hypertensive patients, and 72 per cent of patients with peripheral vascular disease.

It is surprising that the diagnostic value of the contour analysis in resting condition is better than that of reactive hyperemia. This is an exception to the general experience that physiologic stress situations improve the differentiation between normal and abnormal.

However, we found that the diagnostic value of reactive hyperemia is additive to contour analysis; in some patients the reactive hyperemia was impaired when the resting pulse contour was still normal.

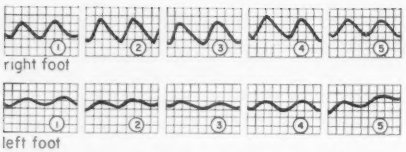

FIG. VI. *Abnormal pulse of the right and left foot in a patient with peripheral arteriosclerosis. The impairment is more pronounced on the left foot, and there are also slight differences in the degree of involvement of the single toes (numbered 1 to 5).*

Clinical Application

The simplicity of the method is ideal for clinical application; a digital pulse record can be obtained in a few minutes, and the evaluation requires the measurement of only four items; cycle length, crest time, peak amplitude, and amplitude at one-fourth diastolic distance.

Use of reactive hyperemia, which prolongs the experimental time by ten minutes, is suggested only when the contour analysis is negative.

In the follow-up of patients with peripheral arteriosclerosis over several months, there was a general parallelism between the trends of improvement or deterioration, and the results of the analysis of the peripheral pulse. In patients with different degrees of peripheral arteriosclerosis in the right and left leg, the pulse curve showed greater deviations on the side of greater clinical impairment. This parallelism, however, was not uniform for the various items of analysis; sometimes the diastolic decline, sometimes the crest time, and sometimes though less frequently, the reactive hyperemia showed the greatest impairment.

We found the method valuable for comparison of the degree of impairment in different toes, as shown in figure VI, obtained in an older patient with peripheral arteriosclerosis. Taken with the same amplification, the left foot shows much greater impairment of the peripheral circulation than the right foot. However, the right foot also showed some definite impairment (prolongation of crest time and delay of diastolic decline), which was little noticed clinically because of the much greater involvement on the left side. There were also differences in the involvement of the single toes; on the right foot, the fourth toe showed the least impairment and, on the left foot, the third toe showed the greatest impairment.

Impedance Plethysmography

While photoelectric plethysmography is a simple and convenient method, it is limited to records of transparency changes, which can be obtained only from the fingers, toes, and ear lobe. Hertzman's ingenious method of photoelectric recording by means of reflected light[4,5] is more universally applicable over the skin surface, but is limited to recording of skin circulation. The new approach of impedance plethysmography, therefore, has definite promise for the study of peripheral circulation. The method records impedance changes in a circuit of a high frequency alternating current (30,000 cycles). Since the blood has a different electric conductivity than the surrounding tissue, the record shows impedance fluctuations with the blood flow and the typical contour of a volume pulse is obtained. Like photoelectric plethysmography, the record is free of inertia.

In cooperation with our work on peripheral circulation, Dr. Otto H. Schmitt of the University of Minnesota Department of Biophysics, has developed a simple impedance plethysmograph which contains only one electronic tube and is used in connection with a direct writing electrocardiograph. It is housed in a small box of 9 by 5 by 6½ inches and weighs only 8 lbs.

The taking of tracings is, if anything, simpler than with the photoelectric plethysmograph. Instead of adjusting the foot or hand position to the light beam, as shown in figures I and II, two elec-

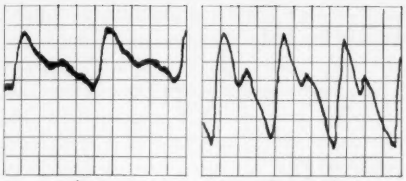

FIG. VII. *Peripheral pulse of the foot (left side) and of the forehead skin (right side), recorded by means of an impedance plethysmograph.*

trodes are placed on the desired location. The main advantage of this method, however, is its universal applicability to any location, and records not only of the skin circulation, but also of the underlying tissue can be obtained.

Figure VII shows, as an example, two tracings: on the right side, a pulse curve of the forehead skin, with the electrodes 3 cm. apart, on the left side, a tracing of the foot circulation, taken with plantar dorsal electrode position. To demonstrate the potentialities of the method, the tracing was taken with the subject wearing socks and shoes. The curves show the characteristics of a volume pulse, and, therefore, the same type of contour analysis can be used as discussed in this article.

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CORONARY HEART DISEASE is more prevalent among coal miners and former miners than most surveys have shown. In a group selected at random, 38 per cent of the men from 55 to 64 had some form of the ailment, and 15 per cent had been confined to bed at some time because of myocardial ischemia. Symptoms were present in only one-half of the cases, or 19 per cent. Both mean body weights and systolic and diastolic blood pressures were considerably greater among the afflicted than among the apparently normal subjects.

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Neuromuscular problems in hemiplegic and paraplegic patients

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This paper emphasizes the importance of surgical correction of deformities in the palsied patient. Surgical procedures are not difficult, do not require a long period of postoperative fixation and, when properly applied, contribute materially to the recovery of patients who, if made ambulatory, can resume self care and often fill a useful place in society.

◆ In these days of concerted efforts to eliminate disease, basic science discoveries and clinical advances are constantly changing the health picture of our people. As new discoveries and contributions are made, new therapies will be needed, prognosis will change, and the life span will be extended, creating new social and economic health problems.

This cause and effect relationship cannot be illustrated better than in the neuromuscular problems that have been created and increased by scientific advances in and out of medicine. The maternity and child welfare program, especially in its work with premature and Rh-factor babies, has prolonged the lives of thousands of cripples who otherwise would have died during infancy. Advances in neurosurgery, use of antibiotics, and better methods for securing fluid and protein balance have prolonged the lives of victims of cerebrovascular accident and spinal cord injury.

Recent studies to determine relationship of trauma, metabolic alterations, blood transfusion, and infection in the serum protein levels of patients;[1,2] studies in the use of hypothermia in surgery; advances in vascular anastomosis and grafts; and the role of agammaglobulinemia[3-5] in immunology, in tissue growth, and in vital homografts will undoubtedly prolong the lives of additional accident victims, many of whom will have neuromuscular disabilities.

The tools of the machine age, especially the automobile, have multiplied incidence of brain traumas. Case findings and the opportunities offered by vocational rehabilitation have brought new demands on our profession to help in the care of their growing load. The responsibility for seeing that these advances bring true benefits and not new burdens to society will depend largely on the medical profession.

It is with these thoughts in mind that this article, which is a review and an evaluation of new uses of old procedures, is prepared. The purpose of the paper is threefold: (1) to stimulate interest in and to evaluate the entire problem seen in victims of cerebrovascular accident and cord injury; (2) to discuss surgical treatment for these patients; and (3) to project into the care of the adult neuromuscular cripple the use of certain operative procedures that have been found beneficial in the care of the child with cerebral palsy.

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The rehabilitation of the patient disabled with a neuromuscular condition is usually a cooperative project which requires the services of the neurosurgeon, the orthopedist, the physical therapy worker and, in many instances, the urologist and plastic surgeon. It is not the prerogative of the orthopedist to direct the work of the other specialists. However, in the rehabilitation of these patients, he must keep in mind the contributions which the neurosurgeon may make to the patient's recovery or improvement. Such contributions are most likely to occur on those services where the neurosurgeon sees all neuromuscular patients. Urologists also can contribute a great deal. For instance, as a result of their care of war injuries, they have developed new and improved methods in handling the neurologic problems of the bladder.

The orthopedic rehabilitation of these patients falls into two categories: restoration or improvement of ambulation and restoration or improvement of manual function.

Treatment of Hand Deformities

Goldner, in discussing reconstructive surgery of the hand in cerebral palsy and spastic paralysis caused by injury to the spinal cord, pointed out that the majority of these hands do not warrant surgery because of the frequent complications, such as loss of sensation, loss of elbow and shoulder function, and mental changes making rehabilitation of the hand unfeasible.[6] However, in the selected patient, surgery, combined with physical re-education, may be of value in returning the hand to useful, although limited function.

Hand problems in these patients can be divided into three types: (1) deformities of the thumb, (2) deformities of the fingers, and (3) deformities of the wrist, any of which may be present alone or in any combination of the three.

DEFORMITIES OF THE THUMB

When a "thumb in the palm" deformity is present, the cause may be multiple. Possible causes are spastic or contracted flexors, a tight web space, hypermobility of the metacarpophalangeal joint, paralysis of the intrinsic muscles of the thumb, or spastic or contracted adductors.

The correction of these thumb deformities depends upon the etiology. If the thumb extensor unit is active, arthrodesis of the wrist in ulnar deviation may bring about active extension. In the presence of a hypermobile metacarpophalangeal joint, fusion of that joint is indicated. In the presence of inactive or overstretched extensors, transplant of an active wrist or finger flexor should be done. Such transfer, when not active, may function as a tenodesis with satisfactory improvement in thumb control. Spasticity and contracture of the web space may respond to sectioning of the web fascia or stripping of the first dorsal interosseous. If indicated, the adductor pollicis should be tenotomized. In the presence of weak opponens, transfer may be of benefit.

FINGER DEFORMITIES

Finger deformities usually consist of hyperflexion with an inability to extend actively. Goldner, in describing the mechanism of this disability, said "Spastic finger flexors may cause the digits to be held tightly in the palm, particularly if the wrist is in dorsiflexion. When the finger flexors are strong and the extensors are weak, if the wrist is flexed, a large object can be grasped with the fingers. As the grasp is tightened, the wrist, because of the increased tension on the extensor mechanism, automatically dorsiflexes Once the hand (wrist) reaches the neutral or straight position, release is nullified and there is increased tension on the flexors."

Much pioneer work is needed for cor-

rection of this disability, and, with the great interest now present in hand surgery, progress can be undoubtedly expected. Preliminary studies have demonstrated that plaster fixation for stretching may possibly lengthen the flexors and allow evaluation of the motor power in the extensors. If the extensors are found to be weak but with function, wrist flexors or strong finger flexors can be transferred to the extensor tendons of the digits. Arthrodesis of the interphalangeal joints of one or several digits may be justified, followed by reinforcement of the flexor profundi with the flexor sublimi, if necessary, to stabilize the fingertips. These procedures serve to get the fingers out of the palm and to put them in a grasping position for large objects.

The index finger in these hands frequently show hyperextension of the proximal interphalangeal joint with flexion of the distal joint and an inability to extend the metacarpophalangeal joint. To improve the pinch power in these fingers, the motor power of the flexor digitorum profundus can be augmented. In the presence of spasticity or paralysis of the intrinsic muscles of the index finger, transfer of a split sublimis can be used to strengthen these muscles with one segment transferred to the lateral band and one segment to the first dorsal interosseus muscle.

WRIST DEFORMITIES

Wrist position plays an important part in hand function, especially in the hand with spastic paralysis. Arthrodesis is the basic procedure used to control severe wrist deformity. If an arthrodesis is to be done in combination with tendon transfers in the spastic extremity, the physician should keep in mind that, following tendon transfers to the extensors, an extension deformity may develop. For this reason, the tendon surgery should be done several months before wrist fusion. Postponing the fusion also gives time to determine the position of fusion for optimal function of flexors and extensors. Usually, in this type of hand, a neutral position of 180 degrees has been found to be most satisfactory. The popular position of slight dorsiflexion makes active extension of the digits more difficult and should be avoided.

Occasionally, the hand will require a few degrees of flexion at the wrist, where grasp release can be performed with the least amount of effort. In positioning the wrist for fusion, ulnar deviation may help to correct the thumb deformities which have been discussed. In the hand which depends on wrist motion for automatic opening and closing of the digits, fusion is contraindicated. When there are severe contractures in the flexors, partial carpectomy without fusion may be of help. For cosmetic purposes or when the deformity is a psychologic handicap, arthrodesis of the wrist is justified.

No one who is not prepared and who has not prepared his patient for failure and disappointment should perform surgery on the hand with cerebral palsy or spastic paralysis resulting from cord injury.

Undoubtedly these surgical procedures are not as successful in this group of patients as when used in those with disabilities for which the procedures were originally described. Nevertheless, in well-selected patients and with well-planned procedures, benefit is possible and much further study and effort are warranted. These corrections are seldom if ever indicated for the hand of the patient who has had cerebrovascular accident, for results in this group are uniformly poor.

Treatment of Deformities of the Lower Extremities

The deformities seen in spastic lower extremities are more amenable to therapy and results of surgery are far more pre-

dictable than in the upper extremities. The type of deformity and the muscle group involved vary but, in most instances, there is an equinus of the foot with a varus or valgus deviation, depending on the extent of involvement of the tibialis or the peroneus muscles. The knee, despite the presence of spasticity in the quadriceps muscles, is usually held in flexion by the stronger flexors with the hip internally rotated, adducted, and flexed.

These deformities present the same picture and the same problem in the hemiplegic adult as in the child with cerebral palsy. Rehabilitation of the extremities in the patient who has had a cerebrovascular accident should begin at the time of the accident and not after the deformities have developed. Frequently, the immediate application of light-weight, well-fitted, corrective plaster casts can prevent contractures, prevent stretching of the weaker muscles, and possibly avert the need of surgery. There is no contraindication to early rehabilitation therapy. The patients should be placed almost immediately on an active exercise program leading toward early discharge from the bed. When it becomes obvious that uncontrolled spasticity will develop, surgery should not be deferred.

Rehabilitation of the palsied patient depends upon restoration of muscle balance, establishment of joint control, and establishment of normal relationships to the line of gravity for upright balance. When spasticity interferes with reaching these goals, it should be eliminated by neurectomies or controlled by tenotomies or arthrodesies, after which rehabilitation can be more readily accomplished.

In a previous paper, based on a consecutive series of 977 patients at the North Carolina Cerebral Palsy Hospital, I discussed deformities resulting from neuromuscular disturbances and reported the results of 590 surgical corrections in 164 of these patients, plus 22 patients from other sources.[7] As the benefits of this surgical program became apparent, I realized that the same procedures are indicated for the lower extremities of the adult hemiplegic patient as for those of the patient with cerebral palsy. In attempting surgical correction of the multiple deformities seen in these patients, the primary deformity should be corrected first.

FOOT DEFORMITIES

The major foot deformity seen is the equinus, caused by spasticity in the calf muscles. Partial neurectomies of the branches of the posterior tibial nerve to these muscles is a simple procedure, suitable for the elderly patient, for there is little or no trauma, and postoperative fixation is not mandatory. However, it is hard to determine the extent of surgery needed and results are somewhat unpredictable.

We have been inclined to do fewer and fewer neurectomies in favor of lengthening the gastrocnemius aponeurosis with the soleus fibers dissected from the distal portion of the aponeurosis. The technic used[7] is a modification of that described by Vulpius.[8] The modification permits a lengthening with the soleus detached from the achilles tendon, which in turn allows for elimination of stretch reflex and clonus.

The lengthening is done in that portion of the aponeurosis between the gastrocnemius muscle belly and the proximal end of the achilles tendon. The operation used is the tongue and groove method, with the middle tongue portion remaining attached to the tendon and the lateral and medial portions remaining intact with the muscle belly. The tongue is dissected from the fibers of the soleus muscle, care being taken that no fibers remain attached to the achilles tendon. To allow adequate correction of dorsi-

flexion of the foot, it is necessary to section the fibrous raphe of the bipenniform soleus muscle.

The operation has several advantages: the tendon sheath is not opened; the tendon is not disturbed; and the incision is well placed over adequate subcutaneous adipose tissue, thus preventing skin adhesions to the deep structures, as is frequently seen when the tendon itself is subjected to surgery.

If the peroneus longus or brevis are spastic, the equinus may be complicated by a valgus of the foot. If the tibialis longus is spastic with or without involvement of the tibialis anticus, there may be a varus deformity. When these complications are encountered, the offending muscle tendon should be lengthened or transferred, depending on the need in each patient. When the extensor hallucis longus muscle is involved, there is a hammering of the great toe. A Jones' procedure with arthrodesis of the interphalangeal joint and the proximal transplant of the tendon may materially improve the patient's control of the foot.

KNEE DEFORMITIES

In flexion deformities of the knee, the gastrocnemius can be the chief offender or may play a part with the hamstrings. Surgery should be directed at correcting the deforming forces. When the gastrocnemius is involved, either a lengthening of the aponeurosis or a release of the origin of the muscle from the condyles of the femur and from the posterior aspect of the capsule of the knee joint may be considered. Either procedure may be combined with lengthening or complete tenotomy of the hamstrings.

The procedure for release of the origin of the gastrocnemius has been described in a previous paper.[9] The technic is not difficult. The exposure is best made by a hockey stick incision which should extend far enough medially and laterally to make possible the release of the medial and lateral expansions. These expansions pass around anteriorly to form the muscle's tendons of origin.

If the deformity of the knee is of long standing, the patellar tendon may be so stretched that the patient can no longer actively extend the knee to 180 degrees. Full extension can be restored by a transfer downward of the insertion of the stretched tendon, either by the Chandler procedure[10] or by a modification in which the tendon is transplanted distally without removal and transfer of the block of bone from the underlying tuberosity of the tibia.[11]

HIP DEFORMITIES

The deformities about the hip are difficult to analyze and also to correct. Many combinations may exist. The most difficult to differentiate are the flexion internal rotation deformity and the adduction flexion deformity. The tensor fascia lata is frequently involved, as are the rectus femoris and the gluteus minimus. In the less involved extremity with mild internal rotation deformity, a Yount section of the fascia lata[12] and a stripping of its intermuscular septum from the femur, combined with a partial neurectomy of the adductor branches of the obturator nerve and a tenotomy of the origin of the adductor longus, will correct most of the deformity and allow for better function. Frequently an Ober release of the tensor fascia lata[13] is needed for full correction. In the more severe cases in which flexion deformity remains after operation, myotomy of the origin of the rectus femoris and possibly release of the insertion of the iliopsoas muscle may be necessary to gain further extension of the hip. This need is especially true in spastic paraplegia resulting from spinal cord damage.

Special attention is called to the hemiplegic patient who suffers a fracture of the neck of the femur of the paralyzed extremity. Before reduction and internal

fixation is attempted, either an intrapelvic obturator nerve neurectomy or a neurectomy of the adductor branches of the obturator nerve and myotomy of the involved adductor muscles should be done.[14] Without such preliminary release of spasticity in the adductors, reduction is likely to be difficult. In those cases in which reduction is obtained without such preliminary releases, the spastic adductors will cause a varus resulting in a shearing force across the fracture site. It has not been our privilege to see a successful end result in a fracture of the neck of the femur in a spastic extremity in which preliminary neurectomies and myotomies had not been done.

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THERE is need for constant vigilance to detect tuberculosis in elderly patients, since the median age at death from the disease has risen to 50 years. Future cases will be bred from the tuberculous man over 40 or woman over 60 whose disease is unrecognized. The elderly person with tuberculosis may have an apparent first infection or he may have survived far advanced disease because of improved surgery and chemotherapy. In either case, management may present problems. The established businessman will probably not cooperate in either his own treatment nor in the survey of his contacts.

The long-lived patient with an occasional recurrent positive sputum may respond to chemotherapy alone and full activity at home and abroad may not be a personal or social hazard. Others, with an almost constant positive sputum, will require a planned program of chemotherapy, bed rest, and surgery. Isoniazid and PAS are considered preferable to streptomycin for the treatment of older patients. Prolonged bed rest saps the strength as well as the morale of elderly persons.

The institutional care of the aged with careless habits is a formidable undertaking. The best approach would appear to be a constant search for early cases in the hope that prompt chemotherapy will prevent advanced disease.

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Management of Dupruyten's contracture

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Although Dupruyten's contracture may be a disabling process in the aged, it can be safely and easily managed to permit total rehabilitation. Surgical intervention is indicated when limitation of digital motion is present. Subcutaneous fasciotomy is a simple, safe procedure in the severely involved hand. Total aponeurosectomy is indicated when the skin of the palm is mobile and of good quality.

◆ Since 1832, when Dupruyten first described the contracture that now bears his name, a voluminous amount of literature regarding the etiology, treatment, and prognosis of this condition has accumulated.[1,2]

The most exhaustive survey of Dupruyten's contracture was conducted in 1948 by Skoog, who collected data on 2,278 patients with 3,529 hands involved with this condition.[3] The average age of the patients at time of examination was 54. Of the series, 166 persons were between the ages of 60 and 69, and 41 between 70 and 79. Thus, the findings were usually present at an age when individuals are particularly prone to other disabling diseases and in whom full use of the hands is particularly desirable.

Boyes, in a study of 154 patients, found that 93 had a bilateral lesion at the time of examination.[4] Of these, 41 stated that the lesions had begun simultaneously in both hands. In his series, 82.4 per cent were men and, in Skoog's series, 89.3 per cent were men.

In my own series of 25 patients with involvement of 30 hands, I have had findings similar to those of Skoog and Boyes. No woman was seen in this group of patients and all were over the age of 50.

Etiology

Dupruyten attributed his original cases to manual labor, and since that time, there has been a constant effort to relate the disease to trauma. However, there is considerable doubt that chronic repetitive trauma is really significant in the production of this deformity and there is no evidence that one acute traumatic episode can produce the changes seen in Dupruyten's contracture.

In my series, only one patient had engaged in heavy labor. One other patient had the onset of symptoms six months after using a pneumatic drill and attributed his condition to use of the drill. All other patients were professional or sedentary workers. In Boyes' series, only 33 per cent of patients were engaged in manual labor. Skoog noted that trauma could not be the decisive factor, since the general incidence in the laboring population is too low. No common etiologic factor has ever been determined.

Warren conceived of the lesion as a benign neoplasm of palmar fascia and noted, in a study of 77 specimens of palmar fascia, that there was no evidence of chronic inflammation.[5] Appearance of immature hyperplastic tissue at the periphery of these lesions lent credence to his theory of a benign neoplastic process. It is unlikely this concept is true,

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however, in view of the definite pattern of deformity noted and the limitation of the infiltrative process to the anatomic confines of the palmar fascia. Skoog postulated that the lesions represented foci of rupture of the collagen fibers of the fascia and suggested that there was some condition of the fascia which predisposed it to tiny tears which healed with scar formation and excessive thickening and contracture.

FIG. 1. *Typical modified Z incision as employed for complete aponeurosectomy.*

Symptoms and Signs

The condition usually begins as a nodule in the palm near the distal palmar crease, involving the palmar aponeurosis to either the fourth or fifth finger. This thickened plaque in the palmar fascia may remain stationary for months, causing few symptoms, or, it may thicken quite rapidly, producing shortening of the digital slip of the palmar fascia with resultant flexion contracture of the involved digit. Rarely is the index finger or the thumb affected, although, in one of my cases, there was diffuse thickening of the palmar fascia and the slips to all the digits. Spaces between the palmar aponeurosis tend to remain uninvolved and, as the contracture progresses, dimpling of the skin occurs in these areas.

As the nodules increase in size, they produce gross thinning of the skin and the flexion creases of the hand become noticeably atrophic. Fixed flexion contracture of the proximal interphalangeal joints may occur, with shortening of the collateral ligaments and of the volar capsule of these joints. In the advanced case, there is usually nodule formation in the palmar slips overlying the proximal phalanges and these thickened plaques may act as a mechanical block to flexion. Thus, the condition may produce gross limitation of both flexion and extension of the involved digits. Because of the interdigitation of the profundus tendons in the palm, flexion contracture of any of the three ulnar digits limits motion of the adjacent digits. The index finger is the only digit capable of independent motion and, this may be limited to a variable degree by flexion contracture of the adjacent digit.

Subjective symptoms are seldom pronounced and the patient usually complains first of limitation of motion of the digits. We have been concerned with this condition because it limits the rehabilitation of patients with other, more serious diseases. Use of crutches and transfer technics from bed to chair may be greatly curtailed by hand deformity and, in our series, treatment has been undertaken primarily to allow total rehabilitation of the patient.

Treatment

Progress of the disease is inexorable and conservative treatment has been found to be of little value, although splinting and gentle stretching of the involved digits tend to maintain mobility of the small joints of the fingers. I have not used vitamin E therapy for my patients, but Boyes noted no improvement in 12 patients treated with alpha tocopherol in doses of 300 mg. daily for three months. Irradiation of the hands has been tried, but Skoog reported no definite improvement in 149 patients treated with irradiation. In Boyes' series, 2 patients received x-ray therapy without benefit.

In digits in which there is fixed flexion contracture of the proximal interpha-

langeal joints, complete release of the contracture is not possible. In these cases, a secondary operation is performed, consisting of excision of the collateral bands of the proximal interphalangeal joint and volar capsulectomy. This procedure has little merit in treatment of flexion contractures of the proximal interphalangeal joint of the fifth digit and, in cases in which there is fixed contracture, amputation of the digit through the metacarpal may be advisable.

In general, the treatment in my series has been confined to surgical relief of the contractures and the patients so treated have fallen into two broad groups—those treated with palmar fasciectomy, and those treated with subcutaneous fasciotomy.

GROUP 1—PALMAR FASCIECTOMY

The first group consists of those patients with definite band-like thickening of the fascia to one or more digits and with one or more nodules in the palm or in the digits, but with minimal skin atrophy or pitting of the skin. These patients have been treated by complete palmar fasciectomy utilizing a modified Z incision (figure I).

Palmar fasciectomy, first done by Lexor in 1900, has not been regarded with wide favor because of the frequent sloughing of skin following the elevation of broad skin flaps from the palm of the hand. For this reason, there must be minimal adherence of the skin to the underlying fascial band and wide flaps should not be created, even in those hands in which skin is at its optimum. No attempt should be made to excise the digital slips through the palmar incision. Separate incisions should be made into the digits in the junctural zone between dorsal and volar skin to resect the thickened fascia in the digits. Considerable care must be exercised to prevent surgical damage to the neurovascular bundles in the digits.

FIG. II. *Preoperative photograph showing atrophy of the skin, moderately severe palmar contracture, and nodule formation.*

GROUP 2—SUBCUTANEOUS FASCIOTOMY

In the second group are those patients whose hands demonstrate gross atrophy of the skin, with noticeable pitting and atrophy of the flexion skin creases. Total aponeurosectomy has been considered unwise in this group and subcutaneous fasciotomy has been performed, as described first by Adams in 1878 and later by Luck[6] (figures II and III).

This technic is relatively simple. It may be performed under local anesthesia, and may be used for patients with a debilitating disease which would preclude a general anesthesia or a brachial block. Multiple cuts are made through the contracted fascia beginning at the level of the thenar eminence and spaced approximately every half inch. I have not excised local nodules in the palm, although this procedure is advocated by Luck. Blind fasciotomy should not be performed in the digits. There is minimal danger of skin sloughing if the incisions are properly placed in the junctural zone of the fingers and local nodule excision may be performed in this area.

I have found that, within six months after fasciotomy and with gentle massage and increased motion of the digits, nodule formation in the palm has tended to dis-

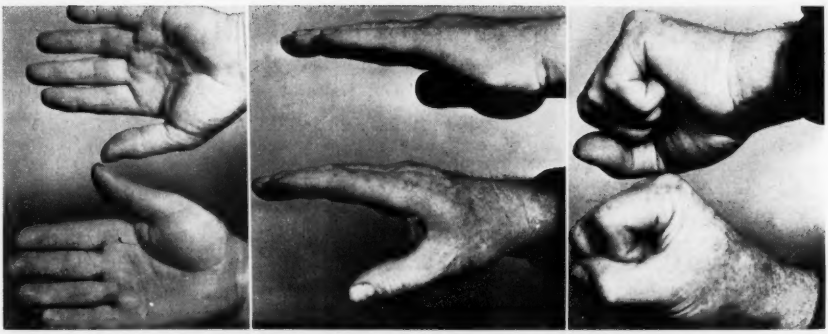

FIG. 11. *Same hands as in figure 11. Postoperative fasciotomy three months after operation, illustrating restoration of skin texture and full range of digital motion.*

appear with great improvement in the quality of the overlying skin of the palm. Although there is a tendency for contracture to recur after this operation, total aponeurosectomy is made immeasureably simpler for the patient if blind fasciotomy is performed as a preliminary procedure.

The anesthetic of choice is brachial block and the procedure is always performed with a sphygomonanometer cuff about the upper arm as a tourniquet.

Tourniquet time rarely exceeds one and one-half hours and this has been considered a safe length of time to maintain compression of the upper arm. When blind fasciotomy is performed, the procedure can be completed within fifteen to twenty minutes. The tourniquet is always maintained until the final dressing is applied.

At the end of the operation, whether blind fasciotomy or total fasciectomy has been performed, the hand is immobilized in a carefully applied pressure dressing, with the digits in position of function. At the end of ten days, the dressing is removed and the patient fitted with a light dynamic splint which is worn at night until full active extension of the digits is possible with ease.

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NOTHING is inherently or invincibly young except spirit. And spirit can enter a human being perhaps better in the quiet of old age and dwell there more undisturbed than in the turmoil of adventure . . . Old places and old persons in their turn, when spirit dwells in them, have an intrinsic vitality of which youth is incapable; precisely the balance and wisdom that comes from long perspective and broad foundations.

GEORGE SANTAYANA, *My Host the World*

Diabetes in the older age group

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Medical problems peculiar to the aged are discussed with respect to diabetes mellitus. Experience is presented derived from the care of 400 diabetic patients who died in a general hospital and the 213 residents of a home for the aged. Special attention is given to incidence, insulin needs, and complications of diabetes.

◆ It is estimated that 2 per cent of the total adult population in the United States suffers from diabetes. Numerous studies have shown that the incidence increases with the age of the population. The incidence is also said to be greater now than ever before but this may be due to the fact that people are better informed regarding diabetes and to wide use of urine and blood examinations.

In a study of 1,539 consecutive deaths occurring between 1930 and 1940 in the adult population of a general hospital, it was found that diabetes mellitus was present in 118 patients, or 7.17 per cent.

A census breakdown for the resident population of the Home for the Jewish Aged in Philadelphia is presented in table 1. It will be noted that over 91 per cent of the 213 residents have passed the age of 70, a commonly accepted average life span for the general population. In the course of routine laboratory tests performed for all residents, about 11 per cent have shown hyperglycemia in the fasting state, and the vast majority of this positive group was past the age of 70.

In a study of 400 diabetic deaths in a general hospital, it was found that the average age at the time of death was 61 years in the period from 1930 to 1938 and 65 in the period from 1939 to 1950. This was interpreted as a gain in longevity corresponding to the new era of chemical and antibiotic therapy. In this unselected series, there were about twice as many women as men. An analysis of this series by age groups showed a ratio of 2.4 women to 1 man for those patients below 70, and 1.5 women to 1 man for those over 70. The incidence ratio of women to men among the diabetic patients in the Home was 1.7. A sex ratio of 2 women to 1 man was also noted by Joslin,[4] Reed,[5] Drolet,[6] and John.[7]

The relative proportion of women to men appears to show a noticeable increase during the years immediately following the female climacteric. This tendency is lost after the age of 70, and it may be significant that in the population of our Home, the sex incidence for the general population is almost the same as that for the diabetic patients alone.

At this point, it might be well to consider a suitable definition for the diabetic states. Just as intercapillary glomerulosclerosis is basically a pathologic syndrome, Cushing's syndrome a clinical one, and Adams-Stoke's a physiologic one, so diabetes is defined as a chemical syndrome. Anyone who has a persistent

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TABLE 1

CENSUS BREAKDOWN OF TWO DIABETIC SERIES

Age group	General hospital diabetes		Home for Jewish Aged			
			Entire census		Diabetes only	
	Men	Women	Men	Women	Men	Women
To 20	1	1				
20 to 29	0	3				
30 to 39	4	7				
40 to 49	8	14				
50 to 59	26	72				
60 to 65	45	101	1	3	0	1
66 to 70			7	8	2	2
71 to 75	43	61	19	34	2	1
76 to 80			15	46	2	5
81 to 85	5	11	23	30	3	6
86 to 90			9	10		
91 to 95			3	2		
96 and up			0	3		
Total	132	270	77	136	9	15

tendency toward hyperglycemia is therefore a diabetic patient.[8] Blood sugar elevations, such as occur with myocardial infarction, are not considered indicative of diabetes unless they show chronicity. This obviously requires time to determine and exposes a common clinical problem in the care of a patient with acute disease whose previous blood chemistry is unknown.

Most clinicians are agreed that hyperglycemia in itself has little or no harmful effect on the patient, although the danger of acidosis is generally acknowledged. No clear-cut evidence has ever been produced to correlate the extensiveness of degenerative phenomena in the diabetic patient with the severity of his condition as judged by insulin requirements. A previous study was made of a series of 357 unselected diabetic deaths, correlating insulin dosage with the primary cause of death (table 2). This study failed to show any unusual antecedent insulin requirements in those patients who had eventually died as a result of any of the degenerative disorders, such as arteriosclerotic heart disease, coronary thrombosis, or cerebral accidents.[3]

It is not surprising, therefore, that some practical clinicians have discarded blood sugar levels as significant of ideal insulin needs and rely on maintenance of body weight and absence of acidosis as the only important criteria. In treating our patients, however, we have tried to maintain some degree of blood sugar stability at a level not in excess of 200 mg. per cent, using the Folin-Wu test.

TABLE 2

CAUSE OF DEATH CORRELATED WITH INSULIN DOSAGE

Diagnosis	No insulin	25 units or less	Over 25 and under 50 units	50 units or over	
Gangrene of legs	22	21	8	8	59
	(37.3%)	(35.5%)	(13.6%)	(13.6%)	(100.0%)
Hypertension and arteriosclerotic heart disease	27	22	7	1	57
	(47.4%)	(38.6%)	(12.3%)	(1.7%)	(100.0%)
Acute cerebral accident	16	17	9	1	43
	(37.2%)	(39.6%)	(20.9%)	(2.3%)	(100.0%)
All infections	52	19	8	1	80
	(65.0%)	(23.7%)	(10%)	(1.3%)	(100.0%)
Acute coronary thrombosis	26	15	6	2	49
	(53.1%)	(30.6%)	(12.2%)	(4.1%)	(100.0%)
Diabetic coma	7	0	2	1	10
	(70.0%)		(20.0%)	(10.0%)	(100.0%)
Others	24	20	12	3	59
Totals	174	114	52	17	357
	(48.7%)	(31.9%)	(14.6%)	(4.8%)	(100.0%)

Some caloric restriction in diet is attempted beyond the usual limitation in carbohydrate intake. Although patients do not always show perfect cooperation, we are satisfied that, when they do, there is less likelihood of severe complications of acute onset because of infection. Even chronic cystitis seems to show acute exacerbations with a prolonged bout of dietary indiscretion.

Of the 24 patients with recognized diabetes who are now under treatment, 14, or 58 per cent, receive no insulin at all. Only two patients require more than 30 units daily. Wilder states that in his experience, 56 per cent of diabetic patients need no insulin and only 14 per cent receive over 30 units daily.[8]

Among the complications to which diabetic patients are particularly susceptible are cholelithiasis and acute coronary thrombosis. Gallstones are seen commonly among our elderly patients. An analysis of 746 autopsies of adult subjects showed cholelithiasis to be present in 11.9 per cent, while a similar survey of 144 necropsies on diabetic patients revealed an incidence of 27.8 per cent.[9] Warren found such stones in diabetic patients in 31 per cent of his cases,[10] Wilder in 28 per cent,[8] and Schleusner in 35.2 per cent.[11]

No discussion of gallstones is complete without mention of acute cholecystitis. Since this condition is commonly associated with biliary calculi, it is not surprising that diabetic patients have more than twice as many cases of cholecystitis as are to be found in the general population. Although the conservative therapeutic approach still has many advocates, even among surgeons, it is hazardous in dealing with the biliary vesicle of the diabetic patient. Delay in such instances is accompanied by a high mortality, and early surgery is mandatory.[12]

Acute coronary thrombosis was quite common among our elderly patients, both diabetic and nondiabetic. In the very aged, its course is often benign and the condition may be exposed only unexpectedly. In the course of a study of 400 deaths in patients with diabetes, death was caused by acute coronary thrombosis in more than 20 per cent.[3] Joslin found this condition under similar circumstances in 21.7 per cent of cases,[1] while Beardwood's comparable figure was 15 per cent.[13]

A study to learn more about some of the physiologic aspects of vitamin B_{12} in the aged is now in progress at the Home. When completed, this will be the subject for a future paper. It can be stated now, however, that there is a relatively low serum level of vitamin B_{12} in aged individuals as a group and that glucose tolerance seems to be directly related to the vitamin B_{12} serum level. The exact significance of these findings is not yet clear.

This study was conducted at the Home for the Jewish Aged, Philadelphia.

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Mastering long term illness

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The most common and devastating long term illnesses are caused by blood vessel deterioration, cancer, the arthritides, and disorders of the nervous system. Significant researches promise a much better control of these afflictions during the next ten years. Specific therapy plus incentive to recover is the basis of management.

◆ Long term illness is one of the major challenges facing modern society. It has been projected into sharper relief because of the spectacular advances in control of the acute maladies taking place during the past twenty-five years. Although long term illness may occur at any age and no period of human existence is immune, the longer an individual lives the more likely he is to fall victim of some chronic malady.

The frequency of long term illness[1] is illustrated in table 1. Using poliomyelitis as 1, the major long term illnesses are listed in order of occurrence.

The most common disorders requiring medical and social services today are (1) diseases of the vascular system, including heart disease, high blood pressure, coronary occlusion, apoplexy, and generalized arteriosclerosis; (2) cancer; (3) arthritis and rheumatism; and (4) nervous and mental disorders. Since breakdown of the blood vessels and cancer account for the loss of about one million lives each year, the need for comprehensive planning to master these killers is apparent.

Heart and blood vessel disease continue to take more American lives than all other causes combined, according to figures for 1953 recently released by the National Office of Vital Statistics.[2] A detailed breakdown for the first five leading causes of death is found in table 2.

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The Major Problems Today

It has always seemed to me that the training of doctors in medical schools should be focused on the most commonly occurring diseases. After a study of normal structure and function and the major pathologic deflections, young doctors should be schooled in the diseases they will meet most frequently in practice. This, of course, is not to infer that we recommend inattention to the other less frequent conditions. Today's medical schools are greatly concerned with just what to teach their students. The whole philosophy and program of medical education is being examined in an endeavor to reorganize training so that graduates

TABLE 1
FREQUENCY OF LONG TERM ILLNESS

Disease	*Frequency*
Poliomyelitis	1
Muscular dystrophy	2
Multiple sclerosis	2.5
Tuberculosis	4
Cerebral palsy	6
Cancer	7
Mental disease	25
Arthritis and rheumatism	75
Heart disease	160

TABLE 2

FIVE LEADING CAUSES OF DEATH

Cause	Number	Per cent of deaths from all causes
Cardiovascular diseases	794,120	52.3
Malignant neoplasm (cancer)	229,110	15.1
Accidents	92,200	6.1
Pneumonia	52,320	3.4
Diabetes	25,390	1.7

will have a much broader understanding of the whole range of medical problems and a better understanding of the patient as a human being.

New technics—particularly the use of the tracer elements in tagging special substances such as food elements, vitamins, hormones, chemicals, endocrine substances, and drugs—bid fair to reveal information of the highest importance having to do with energy maintenance within the body. The study of the presence or absence of specific antibodies as guardians against various infections, the protection of cell substance against premature deterioration, and the maintenance of function against unhealthy assault—all promise a much better control of long term illnesses than is now possible.

THE VASCULAR DISORDERS

Although public attention is being focused on heart disease, the real, basic lesion is a deterioration of the cells of the walls of blood vessels. This, in combination with improper nutrition, is responsible for premature breaking down of some part of the vascular system. The experimental observations of Clive McCay of Cornell and Ancel Keys of Minneapolis are of the utmost importance. The relation between total caloric intake and amount of protein and fat in the diet plays a vital role in vascular deterioration. Furthermore, the influence of exercise, thus far almost unstudied, may be of major importance.

Mann and his associates demonstrated that exercise requiring high energy expenditure kept body weight down and also had a controlling influence on lipoprotein levels in the blood.[3] Conversely, even on a low fat diet, there was an increase in the serum cholesterol, phospholipids, and beta-lipoproteins when subjects were gaining weight and took no exercise. Changes in body weight are indicative of changes in body composition. The blood stream with a rich lipid group in an inactive body may represent an ideal combination of factors for deposition of cholesterol, fatty acids, and lipoproteins in the walls of the blood vessels.

Some recent studies we have made with McCay[4] on experimental animals suggest that deposition of lipid substances in blood vessel walls may be diminished by exercise. This promotes more complete utilization of food stuffs and speeds the blood stream at a rate which offers less opportunity for stagnant chemicals to deposit and fix themselves in the intima and subintimal tissues. Exercise can be a tonic to older individuals by maintenance of vascular and muscular tone, better utilization of food, elimination of fatigue products, and promotion of a sense of well being. Stagnant blood streams may encourage vascular deterioration. Here is an important aspect of our search for the control of heart disease. This resolves itself into a problem of controlling deterioration of the coronary vascular system of the heart wall—a problem involving heredity, nutrition, exposure, and exhaustion.

CANCER

The second major scourge today is cancer, which kills some 200,000 persons each year. A notable reduction might be brought about with wider dissemination and utilization of existing knowledge concerning eradication of early lesions. Work in the areas of normal and abnormal cell growth and metabolism is

proceeding in our research institute here at Lankenau.

Otto Warburg, Nobel Prize winner in 1931 for studies on cell metabolism, has recently offered evidence of exceedingly important differences between the normal cell and the cancer cell.[5] The secret of the cause of cancer is locked in the intricate life-sustaining mechanisms that are continuously in operation within the body cells.

Some twenty years ago Warburg proved that a cell needs oxygen just as an animal requires oxygen for production of energy. He points out that a cell can produce energy either by respiration or by fermentation. The normal cell obtains more energy from respiration than from fermentation; the cancer cell can get about as much energy from fermentation as from respiration. This significant discovery may mark an important epoch in cancer research.

If a normal cell is injured but not entirely destroyed, its respiration, or energy supply mechanism, suffers. A cell may be injured by depriving it of oxygen. Warburg believes that if the cell does not obtain sufficient oxygen it cannot grow normally. Cancer inciters impair respiration by poisoning the cell. To carry on, the cell may resort to fermentation in which case oxygen is not necessary. According to Warburg, when fermentation completely supplants respiration, this represents a transformation from the normal to the cancer cell. If this is true, then the problem is that of preventing excessive fermentation within the cell. Warburg champions this view and believes he has identified the cause of cancer. It may be that we are on the verge of a new insight into the first primary deflection from normal growth which results in a tumor.

ARTHRITIS AND RHEUMATISM

Arthritis and rheumatism continue as uncontrolled maladies. Granted that steroid therapy gives temporary relief and gratifying improvement in numerous patients with these conditions, the basic, underlying deflection of normal bone and joint physiology is still unknown. However, it seems logical to initiate a new approach to control with the use of radioactive tracers, as many of the clinics are now doing. With a clearer understanding of the basic picture, better management may be possible in the future.

NERVOUS AND MENTAL DISORDERS

Patients with disturbances of the nervous system fill some 56 per cent of hospital beds. The increasing interest of the great foundations and government in supporting research in the behavioral sciences is encouraging. The present most disturbing stricture is the lack of trained personnel to carry on these researches. Here again, the relation between sound nutrition, a vigorous and well nourished nervous system, and a well oriented mind is yet to be established.

Adaptation

Acute illnesses, while they may cause temporary inconvenience to an individual, do not last long enough to greatly alter the person's normal way of living. Long term illness, however, changes the mode of living itself.[6] It may tax to the utmost all of the patient's resources. Psychologically, his goals, beliefs, interests, social contacts, and daily pattern of living must be modified while, physically, his body is in the throes of continuing illness.

Physical residues may remain permanently and there is always the memory of the illness, which can be a traumatic experience of first degree. The physician must plan a long range restoration program that will help the patient not only to neutralize and conquer the physical aspect of his experience but to develop a philosophy that will protect him against traumatic memories. There must be adaptation to the condition and utiliza-

tion of all the family and community influences to aid recovery. To give a broader approach and to include all possible resources, the family, rather than the individual patient should be the unit of study.

Adjustments

When a catastrophe strikes an individual, his family is affected and, depending upon his livelihood, his social position, and his interests, an everwidening group of circumstances may per force be altered. As Ruesch has pointed out, the way a man lives may be responsible in part for the disease he will contract. His personality affects the way he will react to a certain catastrophe. Thus it is not surprising to see that recovery from a disease may be related to personality factors. An aggressive person may overexpose himself to danger and may disregard his physician's admonitions, so that convalescence is unduly prolonged.

The type of disorder and the time required to bring it under control may completely alter the patient's future program, change his personality, and have far reaching influences on the members of his family. A person whose occupation requires moving about will be tremendously influenced by an amputation. A person who overindulges in food will be exceedingly unhappy when placed under restrictions for hypertension. The frustrations that are experienced depend in large measure on his daily habits, attitudes, and motivation. Whether he can adjust satisfactorily to altered modes of living depends on his ability to face reality.

Individual Reaction to Long Term Illness

In the final analysis, management of long term illness remains an individual challenge. The way one person reacts will at once bring the illness into proper perspective, whereas another person may be totally devastated. When a patient is so overawed by a heart attack or a stroke that he feels helpless and becomes immobilized, this in itself has a depressing effect on curative processes. The feeling of danger and defeat may be so overwhelming as to paralyze him. Recovery is embarrassed and the time needed for repair of the body systems is greatly extended. In the organism, this is reflected as anxiety and tension.

Jurgen Ruesch emphasizes that the psychologic management of the patient is the most essential step in planning for recovery. Not only do happiness and joy of living depend upon freedom from fear and anxiety, but the physical concomitants of anxiety have an unfavorable influence on physiologic processes. In such a situation, the attending physician must be father confessor, counselor, and friend. He must not only allay the fears of the patient but he must reassure other members of the family. However, if the doctor himself is anxious and impatient, he may lose his best opportunity to bring calm and peace of mind to the people concerned. The release of tension in a critical situation is probably the first and most important job of the family doctor.

The incentive to recovery may be the determining factor in success or failure. Where there is no will to come back, the physician has a big job on his hands. It becomes a sense of values, of interests, of emotional attitudes that will determine the outcome.

Is Old Age a Disease?

So much has been written about the diseases of old age and the deteriorations that occur with time, that people have come to believe the later years of life are a period to be feared. This belief must be corrected.

A positive health program, with emphasis on energy maintenance, control of exhaustion, and encouragement of specific motivation, will have much to do with zest for living in the later years. It is now recognized that hardening of the

arteries is not a necessary accompaniment of long life; that deterioration of the nervous system can often be delayed; and that many of the wearisome experiences of old age can be prevented. There is also a keener awareness of the submerged resources of mature men and women.

Intangibles

To master a prolonged illness, an individual must mobilize all of his resources and take advantage of the newest information concerning his illness and well being. At present, this is often not the case. We know that current dietary practices still permit a nutritional deficiency, especially in older individuals. Fatigue and lack of an absorbing motive invite body deterioration.

We are living in an amazing era. It could well represent the era Benjamin Franklin had in mind when, in 1780, he wrote to his friend Joseph Priestly:

> The rapid progress true science now makes, occasions my regretting sometimes that I was born so soon. It is impossible to imagine the height to which may be carried, in a thousand years, the power of man over matter. We may perhaps learn to deprive large masses of their gravity, and given them absolute levity, for the sake of easy transport. Agriculture may diminish its labor and double its produce; all diseases may by sure means be prevented or cured, not excepting even that of old age, and our lives lengthened at pleasure even beyond the antediluvian standard.

Some thirty years ago, in a book called, *The Wisdom of the Body*, psychologist Walter B. Cannon called attention to the amazing resources present in every human being. These natural endowments include abundant reserves in the heart, liver, kidneys, nervous system, and brain. The body possesses a wisdom all its own which, if nourished and cared for, will guarantee a long and abundant life. The emotional glow and the happiness of living which the talented Rabbi Liebman talked about can be carried well into old age, and serve as an effective antidote against the weariness and boredom which some associate with the higher years. There are intangibles, which can never be reduced to mathematical formulas, which color existence and weight the scales on the positive side.

THERAPY OF SPIRIT

Health is to be judged more by quality of life than by length of days, says Luxton. He emphasizes the unity of body and mind and finds health as the root of the word, which, in its highest sense, means "holy." There are primary diseases of the body, as well as of the mind and spirit. In order to minister to the person suffering from a long term illness which depletes resources and which threatens his very existence, an understanding of the complete individual is necessary. Therapy must include replenishment of all the protective adjuncts that are available.

Modern science recognizes a hate hormone and the physical effects of fear and despair. These emotions bring a definite change in the chemistry of the body. But, on the positive side, this chemistry of despair may be changed to that of hope and enthusiasm. The hate hormone can be neutralized by the new vitamins of faith, kindliness, and a cheerful heart. Doctors know that people with a long term illness often seem to die by degrees. But they may also live by degrees and, if something is lost each day, something may be also gained that will throw the balance in the patient's favor.

Impèratives for Survival

With more effective control of the long term illnesses, communities should enjoy more abundant health, but quantitative extension of the life span may well be a curse rather than a blessing, unless older people can participate in the work of the world and continue as sustaining members of society. The adolescents and young adults of today cannot be

expected in twenty-five or thirty years to maintain some 30 million nonproductive citizens over 60 years of age. Parasitism is a form of social invalidism. For their own benefit and the protection of society, older people must be kept as selfsustaining citizens as long as possible.

Recently the distinguished historian, Arnold J. Toynbee, called attention to a new emotional situation being evidenced on a world-wide scale. Fabulous benefits are being made available for a more vigorous and happier way of life. New and potent remedies for many illnesses are being added to daily. Hope is high for control of vascular deterioration, cancer, the arthritides, and mental disorders. To obtain the benefits of these new discoveries, there must be leadership in community education and scientific research. This leadership, which can be provided by cooperation of the community agencies interested in health and medical service, is the best guarantee for mastery of long term illness and the creation of a higher level of health for all our citizens.

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ELECTROCARDIOGRAPHIC EXAMINATION of the aged frequently uncovers major changes compatible with myocardial infarction which may be unsuspected clinically. Myocardial infarction in the aged may present itself (1) without pain or any other symptoms referable to myocardial infarction; (2) without pain, but with other symptoms referable to myocardial infarction; or (3) with pain. Patients in the first and second groups present symptoms such as dizziness, weakness, and confusion, or there may be heart failure with severe dyspnea. These symptoms are attributable to cerebral anoxemia, congestive failure, and visceral congestion.

These atypical cases among the aged may be explained by the characteristics of this group with respect to coronary artery disease, cerebral arteriosclerosis, reduction in memory function, loss of the meaning of pain sensation, and mental attitude toward symptoms of disease.

Acute myocardial infarction should be suspected and sought for in older patients who show unexplained behavior changes, sudden signs of cerebral insufficiency, unexplained abdominal complaint, or sudden fall in blood pressure.

M. RODSTEIN: The characteristics of nonfatal myocardial infarction in the aged. Arch. Int. Med. 98: 84-90, 1956.

Stimulation therapy for mental disorders in aged patients

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A new symptomatic therapy, using a combination of vanillic acid diethylamide and nicotinic acid, was tested in a series of 45 agitated, confused, elderly patients at Vasa Hospital, Gothenburg. Good results were reported in 17 patients, with best results in agitated patients with cerebral arteriosclerosis and signs of vascular lesions.

◆ Treatment of various states of agitation and confusion has assumed a prominent place in the therapy of somatic diseases of old age. Modern geriatric research has established that the unfavorable effect of the most common barbituric acid preparations on such states is connected, among other things, with retarded resorption and excretion of these drugs.[1,2] Instead of the intended sedative effect, the result is often a still more pronounced state of confusion or a protracted state of apathy. Our hospitals have a large number of aged patients with more or less protracted states of mental confusion, in which the connection with a somatic disease is sometimes obvious,[3] but more frequently is difficult to trace. For several reasons, qualified mental care is not indicated for many of these patients, and their treatment at general hospitals is a source of much trouble.

Thus the first reports, in 1953, of favorable results with chlorpromazine therapy for various degrees of confusion and dementia in aged patients were greeted with great satisfaction, even by nonpsychiatrists.[4]

The hopes set on these drugs were fulfilled to a great extent, especially in cases in which a sedative effect was desired for agitated patients who were highly disturbing to others. In Scandinavia, the results of chlorpromazine therapy have been reported recently.[5-8] However, more or less serious side effects from chlorpromazine have also been mentioned in Scandinavia.[5,6] The side effects have been interpreted as allergic reactions from the skin, the liver, and the bloodforming organs. The appearance of agranulocytosis is perhaps the most serious of these side effects.[9]

Thus, favorable results of clinical trials with new pharmaceuticals for treatment of senile states of psychosis and confusion are to be regarded as highly important.

Clinical Study

Since the end of the 1940's, there have been trials of treating senile psychosis with various agents causing cerebral stimulation. Caffeine, ephedrine, pentazol, and various vasodilators have been used for their analeptic effect on cerebral centers, aiming at improved cerebral circulation. For nearly ten years, we have

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TABLE 1

DIAGNOSIS AND RESULTS

Diagnosis	Number of patients			Therapeutic effect		
	F	M	Total	Good	Some	None
Senile dementia	4	1	5	2	2	1
Arteriosclerotic dementia	5	2	7	2	3	2
Cerebral arteriosclerosis and sequelae of cerebrovascular lesions	10	6	16	8	4	4
Generalized arteriosclerosis and cerebellar degeneration	1	1	2		2	
Cerebral arteriosclerosis and prostatic hypertrophy		5	5	1	4	
Coronary arteriosclerosis and prostatic hypertrophy		1	1			1
Generalized arteriosclerosis, diabetes mellitus, and pyelonephritis	4	1	5	2	1	2
Generalized arteriosclerosis and chronic endocarditis	1		1			1
Various conditions including pernicious anemia and secondary brain tumor	3		3	2		1
	28	17	45	17	16	12

used a combination of caffeine, ephedrine, and B-complex vitamins; in some cases this treatment appeared to have had a certain effect.

Before treatment is begun, the patient is subjected to a complete clinical examination, with special reference to factors causing cerebral anoxia, such as anemia, circulatory insufficiency, renal insufficiency, and chronic intoxication. After applying causal therapy against the basic disease, we have inaugurated symptomatic therapy—simultaneously or as concluding treatment—designed to improve cerebral circulation.

For the past six months we have used a preparation called Sevanil, consisting of vanillic acid diethylamide and nicotinic acid. It is used in the form of tablets, each containing 3 cg. vanillic acid diethylamide and 5 cg. nicotinic acid. One tablet was given 3 times a day during the first week; 2 tablets, 3 times a day during the second week; and, in some cases in which the effect was not satisfactory, dosage was increased by degrees to 3 tablets, 3 times a day. Tablets to facilitate this higher dosage are called Sevanil forte, with 1 tablet corresponding to 3 tablets of Sevanil. Tablets were given in connection with meals, and were generally well tolerated.

The 45 patients in the study varied between 65 and 91 years in age, with the majority between 70 and 80. The various diseases from which they suffered are listed in table 1.

Indications for treatment were apathy, agitation, and confusion. Some patients vacillated between agitation and apathy, and most of them were confused. Cases were classified with reference to the predominating symptom or the symptom that was most troublesome from the viewpoint of those who provided care.

Results

Before treatment was begun, the patient was observed for some time in order to establish that the mental state was not occasional or capable of receding spontaneously. In most cases, the patient's mental condition had been unchanged for several months.

In the individual case, treatment was extended over several weeks, even after a good effect had been obtained from the drug. A noticeably favorable effect generally appeared after one to two weeks, but in some cases not until after

TABLE 2

INDICATIONS AND RESULTS

Indications							
Apathy		*Agitation*		*Confusion*		*Effect*	*Total*
F	*M*	*F*	*M*	*F*	*M*		
4		8	2	2	1	Good	17
2	5	3	3	2	1	Some	16
5	3			2	2	None	12
19		16		10			45

two to three months of treatment. Then, if no result was observed, treatment was discontinued.

Results of treatment since the spring of 1955 are shown in tables 1 and 2. It is seen that results were considered good in no less than 17 cases out of the total of 45. Results were particularly good among the agitated and disturbing patients, whereas the effect was not so noticeable among the apathetic patients, who showed good results in 4 cases out of 19.

It appears that the best effect is to be expected in states of agitation and confusion in patients with symptoms of cerebral arteriosclerosis and signs of vascular lesions. Favorable results were also observed in patients with senile and arteriosclerotic dementia—that is, in some cases, such symptoms as urinary and fecal incontinence disappeared during the course of treatment.

Nordman has used the same drug in mental hospital patients and reported favorable results in 18 out of 49 patients.[10] He considers the drug to be a valuable addition to the arsenal of geriatric psychiatry, offering good symptomatic improvement in many difficult patients, even though the effect is not as radical as that of electroconvulsive therapy.

It seems clear to us that Sevanil treatment is well suited also for the less difficult old patients with mental changes who are treated at somatic hospitals.

From the Vasa Hospital 1, Gothenburg.

The Sevanil and Sevanil forte tables used in this study are made by AB Pharmacia, Sweden.

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Response potentials of vascular tissues and the genesis of arteriosclerosis — a review

Part II A. Inflammatory agents

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Part II of this review presents evidence supporting the three major concepts regarding pathogenesis of arteriosclerosis — the inflammatory theory, the lipid-metabolic concept, and the mechanical or hemodynamic theory. It also shows the areas to which each concept applies and the characteristics and sequence of development of various components of the arteriosclerotic plaque.

◆ The idea that inflammatory factors may cause arteriosclerosis is probably the oldest etiologic concept regarding this disease. In 1740, in a treatise dealing with hardening of the coronary arteries, Crell took the stand that the incrustations were of a tophaceous nature derived from pus, and observed that the induration was not confined to senility, but might occur at any period of life.[1] Crell's ideas, as reconstructed by Morgagni,[2] were that sluggish juices present in the blood tended to obstruct the arteries' own intrinsic vessels with resultant inflammation and suppuration. Thus he was also probably the first to recognize the importance of the vasa vasorum. He recognized further that the outpoured "pus" tended to separate the media from the intima, and in time petrification took place at this site, with formation of hard scales between the coats. Cruveilhier, who devoted special attention to thrombi at the site of sclerotic lesions, looked upon arteriosclerosis as fundamentally an inflammatory process.[3]

Over a century later, Virchow again stressed the inflammatory nature of the lesion; he recognized a stage of irritation with some of the features of inflammation as well as a succeeding fatty metamorphosis, and introduced the term "endarteritis chronica deformans."[4] Rindfleisch clarified Virchow's view, representing the initial lesion as a chronic inflammatory overgrowth of connective tissue, which he attributed to mechanical irritation of the blood pressure at the affected point on the intima.[5] This view has been reintroduced recently by Meyer.[6]

Infections

The distinction between a nonspecific inflammatory component of arteriosclerosis and a specific arteritis and aortitis such as occurs in syphilis was presented subsequently by others,[7-9] and was definitely established by Schmorl, who demonstrated the spirochetes in the aortic lesions.[10] After such an infectious nature of specific chronic obliterating endarteritis was

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discovered, morbid anatomists for a time gave up the view that ordinary arteriosclerosis was a lesion of inflammation except as all reparative and compensatory tissue proliferation might so be considered. Others later revived serious consideration of infectious and toxic factors.[11-13] The stimulus of their work led to studies of various infectious agents as well as bacterial toxins for specific cytotoxic effects on vascular tissues.

Patients with chronic arteriosclerotic cardiac disease at times appear to respond quickly to removal of certain foci of infection, such as gallbladder and paranasal sinuses. An investigation was made of the possibility that such foci might constitute a source of infectious material for production of inflammatory lesions in distant arteries. In human material, sclerotic changes were observed in deep-lying vessels of infected paranasal sinuses in which diplococci were demonstrated. Anatomic pathways via the lymphatic system to the systemic circulation have been demonstrated, and organisms have been traced along this pathway to the spleen and liver.[15] Diplococci have also been demonstrated in coronary arteries and in thrombi in these vessels, but the possibility of postmortem bacterial growth has not been conclusively excluded. Experimental sclerotic lesions were produced in rabbits by repeated intravenous inoculation of streptococci from a coronary thrombus in a human case,[16] and it was shown that trypan blue or organisms introduced into the paralaryngeal lymph nodes in rats can be demonstrated in phagocytic cells within the wall of the aorta and coronary arteries.

Allergic States

A second group of inflammatory vascular lesions are those attributed to allergic states in which connective tissue structures are involved. First included in this group were rheumatic fever, rheumatoid arthritis, periarteritis nodosa and dermatomyositis;[18] later scleroderma was added,[19] as well as lupus erythematosus and possibly malignant nephrosclerosis.[20,21] More recently thrombotic thrombocytopenic purpura has been suggested.[22]

Specifically, this group of diseases is associated with changes in a collagenous structure, usually termed fibrinoid degeneration. Fibrinoid materials in these diseases have similar tinctorial properties, indicating that an alteration in ground substance is involved; this further suggests that the chemical composition of fibrinoid in each of these diseases may be similar or identical.[23] On the other hand, fibrinoid degenerative has been defined as a "descriptive morphologic term indicating certain well-defined optical and tinctorial alterations in the collagenous fibers and ground substance," and fibrinoid degeneration and collagen sclerosis have been considered to be the "morphologic expression of different phases of a disturbed colloidal collagen system."[24]

Clinically, these diseases can usually be separated, but the wide variation in symptoms occasionally creates difficulty in identification of any one specific entity. They also overlap pathologically and occasionally give rise to alterations which suggest an entirely different diagnosis. The generalized Schwartzman phenomenon is characterized pathologically by widespread fibrinoid lesions affecting the cardiovascular system. This and other observations form the basis for the theory of an allergic etiology.[25,22] In many instances, organisms and their toxins may play a role in the development of such allergic states.[25]

These various studies suggest that the fibrinoid which accumulates in various organs and tissues is probably derived from the circulating blood and that fibrinogen may be involved in its formation. Such fibrinogen and fibrin may also be involved in the formation of collagen, as pointed out in part I of this review; and some aberration in the processes of

development of the latter substance may lead to the formation of fibrinoid.

Toxic Factors

Nevertheless, allergic states may not be responsible for all instances of fibrinoid degeneration and associated inflammation. The fibrinoid degeneration of renal arterioles was reproduced in dogs made uremic and severely hypertensive by bilateral constriction of the main renal arteries.[26] Furthermore, it was observed that "increased intravascular pressure produced experimentally in animals leads to acute arterial changes that are not only similar to those occurring in hypertension in man, but also are often indistinguishable from those that follow chemicals, bacteria, or the hypersensitive state."[27]

Masson states that "substances present in the body and part of its normal mechanism of homeostasis can, in appropriate combination, elicit hypertension and vascular damage."[28] Since salt somehow enters into this process, probably through a sensitizing effect, it may be this factor rather than extensive secretion of steroid hormones which plays such an important role, although the two are closely interrelated. Although hypertension is an important factor, it acts on vessels sensitized to damage either by salt excess or electrolyte shift and that this may account for the lack of a definite quantitative correlation and vascular damage. In studies on the rat, such experimentally produced vascular lesions did not appear well correlated with the severity either of hypertension or uremia, although hypertension as an augmenting factor cannot be ruled out.[29] Changes in serum levels of sodium, potassium, chloride and water were observed in the same experiments; it is believed that dysfunction of the kidney and altered electrolyte metabolism may play a role.

The extensive investigations of Holman are also interesting in this regard.[30] Arterial lesions closely resembling those of rheumatic fever and periarteritis nodosa in man were produced with regularity in dogs by feeding a high-fat diet for eight weeks or longer, and then inducing renal insufficiency.[30] The dietary toxicomponent appears to be an unsaturated fatty acid; surprisingly, the superimposition of an artificially produced hypercholesterolemia prevents development of typical lesions. There is no evidence to support a hypersensitivity reaction, since omission of the dietary toxicomponent eliminates the response of the arterial system to standard renal insufficiency. Although hypertension may aggravate the lesions, they develop in its absence. Neither experimental nor spontaneous infections have precipitated the lesions in properly fed dogs. He notes a striking resemblance of some of the healing and healed lesions to the so-called spontaneous arteriosclerosis of dogs.

Unknown Inflammatory Agents

In addition to infectious agents, toxic factors, and allergic states, there remains a group of inflammatory vascular lesions of essentially unknown etiology. Included in this category are stenosing arterial lesions, for the most part of the coronary arteries,[31-33] cerebral arteritis with aneurysm formation,[34] and such lesions as giant-cell arteritis, temporal arteritis, and Buerger's disease.[35]

The association of stenosing arteritis with rheumatic fever has been emphasized, although this appears to account for only a relatively small proportion of the cases.[32] The possible role of hormones in causing cerebral arteritis, in a sense corresponding to the views of Masson,[28] has been pointed out. Except for the role of tobacco, which is probably an aggravating agent, the cause of Buerger's disease remains a mystery.

We have not discussed the possible role of viruses. Although the reaction of lymphocytic cuffing of small vessels in

many virus diseases is generally recognized, the possibility of more extensive involvement of vascular structure requires exploration.

Pathology in Group I Arteries

Of the specific infectious diseases which may involve the major elastic arteries, syphilis and rheumatic fever are probably the two most common. The regional distribution of lesions in the aorta is recognized in lues,[36,37] but is not so well understood in rheumatic fever, despite several excellent studies.[38-41] In both diseases, the aortic lesions are characteristically above the diaphragm and show medial scarring with destruction of elastic elements. In both diseases, there is perivascular lymphocytic cuffing of the vasa vasorum. In syphilis, the loss of elastic elements may lead to decalcification of the media,[42] but no such findings have been reported in rheumatic fever. Although the possibility of aneurysm formation is recognized in syphilis, it is generally overlooked, but may occur in rheumatic fever. Such aneurysm formation of the ascending aorta has been observed associated with rheumatic aortitis.[41]

Dafoe reported 11 cases of abdominal aortic aneurysm caused by tuberculosis, with rupture of two,[43] and Schmorl observed 5 cases in a series of 123 autopsies in which tubercle bacilli were found in atheromatous plaques.[10] However, the latter may represent superimposed infection on a pre-existing atheromatous ulcer. Bacilli in a calcified aortic plaque were demonstrated in a case of endocarditis caused by Bacillus pyocyaneus.[44] It is difficult to imagine so rapid a development of an advanced lesion in an acute or subacute infectious disease; it is more likely that this, too, represents a spread of organisms into an already fully developed plaque.

In a review of 19 patients with acute and chronic arteritis involving the pulmonary arteries and patent ductus arteriosus, 11 had a history of antecedent or current specific bacterial disease. In three patients, ranging in age between 22 and 34, an atheromatous plaque of the aorta was demonstrated opposite the mouth of the inflamed ductus. An acute or subacute thromboarteritis has been described—probably of infectious origin.[46-49] It was suggested that this might be one cause of idiopathic pulmonary arteriosclerosis. Ayerza, in his original description of the disease which bears his name, believed it was caused by syphilis on the basis of a positive Wassermann test,[50] and Warthin, influenced by this report, described a proved case of syphilis of the pulmonary artery with aneurysm formation.[51] Such an etiology of idiopathic pulmonary hypertension has since been abandoned. However, arteriosclerosis of significant degree in the major pulmonary arteries is most likely secondary to pulmonary hypertension, and, in some instances, the latter may be caused by an increased peripheral resistance resulting from changes in small arteries of the pulmonary circuit caused by primary pulmonary inflammatory disease.

As far as toxic and allergic factors are concerned, involvement of large elastic arteries is not usually described; most of these studies have been on Group II and Group III vessels. Nevertheless, a granulomatous arteritis with giant-cell formation which may fit into this etiologic group was observed.[52] This involves not only smaller vessels but occasionally also the aorta, carotid, and iliac arteries. This lesion is characterized by necrosis of the media with fragmentation of the internal elastic lamella, and great intimal proliferation with giant-cell formation on the medial side of the internal elastic lamella. Possibly changes in large elastic arteries in this etiologic group are obscured by the large quantities of elastic tissue.

From the standpoint of the end-stage lesion, the arteriosclerotic focus may not result from the immediate local infec-

tious, toxic, or allergic process, but rather as an indirect affection of the vascular wall through a series of long-continued metabolic or mechanical disturbances. Aschoff considers the thickening of the intima in syphilis to be a compensatory process to destruction of the media.

Pathology in Group II Arteries

In any acute infectious process involving an organ, the inflammatory exudate may extend into the walls of arteries supplying that organ.[53] In the healing phase of such a process, a sclerotic lesion may develop. In the end-stage, this generally results in replacement of muscular and elastic structures by hyalinized fibrous tissue, although there may be reactive responses of intimal connective tissue, elastic fiber, and muscle of types described in part I of this review.

In addition to direct extension of an infectious process, vascular embolization from an endocarditis may appear, or there may be lymphatic spread of infectious material to vessels supplying other organs. Such emboli usually involve second and third order branches of the cerebral and pulmonary circuits, the splenic circulation, and occasionally the coronary arteries. Lesions of this type are generally seen in an acute stage, but they may also undergo organization and form hyaline masses which, in the end-stage, produce segmental sclerotic lesions. In spontaneous or experimentally produced phlebitis, there is evidence to support an extension of the inflammatory process to the adventitia of adjacent arteries, with subsequent involvement of the total wall via the vasa vasorum.[54,55] This process may then lead to the eventual development of a segmental sclerotic lesion. In older experiments, in which a variety of organisms and bacterial toxins were injected intravenously into rabbits, hyaline or mucoid fibrous intimal nodules developed.[11,12] The failure to develop more extensive lesions in the rabbit was attributed to a poorer adventitial vascular bed and vasa vasorum than is found in human arteries.

Chronic granulomatous diseases may also involve Group II arteries. Syphilitic arteritis involves the cerebral arteries most frequently and occasionally the coronary vessels and those of the extremities. This takes the form of a gummatous lesion or of an obliterating endarteritis, both of which may be distinguished, at least in an intermediate stage, from the more common form of arteriosclerosis. The lesions of rheumatic fever involving Group II arteries are well described by Pappenheimer and von Glahn;[56] more recently this disease has been discussed as a cause of coronary arteriosclerosis in young people by Saphir and Gore.[32]

Toxic and allergic factors have been investigated as a possible cause of coronary sclerosis and thrombosis. Fatal coronary cases have been reported following respiratory infections, antisyphilitic therapy, injections of serum, tetanus antitoxin, typhoid vaccine, and drug hypersensitivity. Such fatal accidents may be caused by an acute swelling of the arterial intima (acute urticaria).[57] It is conceivable that nonfatal cases of this type might progress to stenosing sclerotic lesions of coronary arteries. In a study of spontaneous coronary sclerosis in the chick, inflammatory medial lesions which appear to initiate an intimal response were observed, leading to the conclusion that infectious disease of an acquired type does not seem to be responsible for the inflammatory reaction.[58] Congenital infections, similar to that in fowl leukosis or hypersensitivity to dietary agents, may be the responsible factors.

Pulmonary arteritis has been reported associated with pulmonary hypertension due to mitral stenosis,[59-61] in pulmonary hypertension due to congenital heart disease,[62-64] and in pulmonary hypertension of unknown etiology.[65-67] Cases of polyarteritis nodosa involving both systemic and pulmonary arteries have been

reported.[68-71] The presence or absence of pulmonary artery involvement has been thought to be a point of differentiation between hyperergic arteritis and arteritis due to hypertension.[72] If such a distinction is valid, pulmonary localization may be used as a criterion for excluding hypersensitivity cases.

Cerebral arteritis with lesions resembling those of polyarteritis nodosa has been found in cases of pneumococcal meningitis surviving seven to nine weeks.[73] It is suggested that sensitization by repeated reinfections of the cerebrospinal pathway from an unresolved focus may play a part in causing this type of arteritis.

There remains, among the inflammatory lesions of Group II arteries, a group of unknown etiology. Von Albertini[31] and Bredt[74] have marshalled evidence for the identity of a stenosing lesion of the coronary arteries with thromboangiitis obliterans. The fact that this disease may involve arteries supplying viscera as well as those supplying the lower extremities is often overlooked, and it is not clear whether Buerger's disease can involve coronary arteries without also involving the vessels of the lower extremities. Since Buerger's disease is considered a panarteritis and phlebitis of medium and small arteries, the observations[54,55] regarding extension of an inflammatory process from veins apply here also. Buerger believed that this disease was caused by some infectious agent, although none has yet been demonstrated. Whatever the inflammatory agent may be, it apparently gains entrance into the artery wall in a manner comparable to some known infectious agents.

Although von Albertini[31] and Bredt[74] have emphasized Buerger's disease and Saphir and Gore[32] rheumatic fever as causal factors, most cases appear to have an unknown etiology and manifest certain pathologic features resembling the group of necrotizing angioses. The cases reported by these authors as well as those by Zak involving coronary arteries[33] have many characteristics in common with those observed in cerebral vessels.[34] In both locations, the lesions had in common a stage of necrosis with acute inflammatory reaction followed by irregular fibrous replacement of the media and segmental adventitial hyalinization. The cerebral artery lesions, however, showed no fibrinoid deposits, and no instances of thrombosis were encountered. On the contrary, the latter may progress to aneurysmal dilatation rather than to stenosis; this outcome has been attributed to certain inherent structural differences, particularly the absence of an external elastic lamella, which in the coronary and other arteries affords protection against overdistention. These lesions appear to develop predominantly in younger age groups; in the series reported by Saphir and Gore, the age range was 18 to 29. Three cases of stenosing coronary arteritis with rupture of the intima and thrombosis following psychic or physical strain have been reported.[75]

Pathology in Group III Arteries

What has been said regarding direct spread of infectious material from parenchymatous tissues to arteries applies to Group III as well as to Group II vessels. The addition of infectious processes may have indirect effects on arterial structures even when the infectious process does not directly involve the arterial wall. One of the best examples of this is the intimal reaction in the arteries of the subarachnoid space in tuberculous meningitis. In such arteries surrounded by the tuberculous reaction, the medial coat may remain intact but the endothelial layer of the intima may be greatly increased in thickness and the endothelium lifted by fluid and inflammatory cells. This is followed by proliferation of cells resembling primitive fibroblasts and eventually a dense concentric fibrous thickening of the intima results.[76]

Nor can any sharp distinction be made

between Group III and Group II arteries regarding allergic and toxic factors. Possibly hypersensitivity angiitis can be distinguished from other vascular lesions such as periarteritis nodosa on the basis of its widespread lesions involving small intrinsic venules, arterioles, and small visceral arteries. Unlike polyarteritis, large muscular arteries are rarely included and the lesions of hypersensitivity states show no predilection for sites of bifurcation. The fully developed lesions consist of fibrinoid necrosis with pleomorphic cellular exudation within and around the wall; all lesions are of about the same age. By contrast, in periarteritis nodosa, there are lesions in all stages of development, beginning with degeneration of adventitial collagen at bifurcations of muscular arteries, followed by proliferation of fibroblasts and inflammatory exudation. Subsequently, thrombosis and aneurysmal dilatation lead to healing by granulation tissue. In the end-stage, the vessels of polyarteritis consist of a mass of vascularized fibrous tissue. Although Bergstrand does not make such a sharp distinction between polyarteritis and the vascular lesions of anaphylactic states, his description of the latter corresponds to a hypersensitivity angiitis as far as distribution and microscopic characteristics are concerned.[77]

Pathology in Group IV Vessels

For the most part, inflammatory processes in arterioles and capillaries represent a continuation of processes from Group III vessels. Arteriolar and capillary sclerosis have been most intensively studied in the renal glomerulus and, to a lesser extent, in the retina and islets of Langerhans. Inflammatory processes in the glomerulus begin with an increase in nuclei from endothelial proliferation, accompanied by collections of leucocytes in and around capillaries. The endothelial cells swell and may occlude their lumina. The basement membrane of capillaries increases in volume and assumes a fibrous character resembling collagen. The latter process may proceed to replacement of capillary structures and eventually become hyalinized.

Arteriolar and capillary changes of the glomerulus and retina in diabetes have received particular attention in recent years. The basic processes of sclerosis are probably similar, but there appears to be an intensification. There are also certain differences in distribution of hyaline, particularly in the glomerulus. From this standpoint of etiology, steroid hormones of the adrenal cortex may be the responsible agents.[78] To this extent, they would fall into the same category of vascular phenomena having an inflammatory component.[27,28]

These changes probably represent the fundamental reaction of capillaries and arterioles to inflammatory agents in any anatomic location. Their concentration in a prominent structure, such as the glomerulus or the retina, and the spectacular clinical phenomena associated with diseases of these structures may tend to obscure changes of a similar character in other sites of inflammatory reaction with less prominent capillary structures.

Discussion

MacCallum was unable to obtain evidence from statistical data derived from autopsy material to support the concept that infections, whether acute or chronic, are important in the pathogenesis of arteriosclerosis.[79] However, such a conclusion was influenced by his limited definition of this disease. The latter was applied only to the typical disseminated distribution seen in elderly individuals. However, it is evident that inflammatory processes may produce either local or disseminated sclerotic lesions, but that the pattern of dissemination is not that observed in the common form of arteriosclerosis. Lesions may be located in critical organs, such as the heart or brain,

where they may cause catastrophes similar to those complicating arteriosclerosis. Such cases undoubtedly contribute to statistics of death attributed to arteriosclerosis.

Inflammatory factors may be disseminated via the arterial stream and may also reach arteries by direct extension from an adjacent focus via the lymphatic stream to the systemic circulation, or from veins via the vasa vasorum. Furthermore, in sensitized arteries, sudden elevations in blood pressure may initiate an inflammatory process.

Thrombi may develop early or late. Over a century ago, Rokitansky presented a concept regarding development of atheromatous plaques, based on the deposition and subsequent organization of small nonocclusive thrombi covering the endothelial lining;[80] this thesis has been revived recently and extended by Duguid, who believes that organization of such masses of fibrin leads to development of atheromatous plaques.[81] Although an inflammatory basis for such a process has not been stressed, it deserves consideration, for Zak and coworkers observed a fibrinoid layer between arterial wall and occluding thrombus in stenosing coronary arteritis.[33]

In general, the sclerotic lesion is believed to represent reparative thickening following toxic, allergic, or infectious injury. However, inflammatory processes may occur in arteries without being caused by these agents.

Late thrombosis may be a complication of progressive narrowing which develops in the course of healing of an inflammatory lesion. Fibrous proliferation of the intima, with narrowing of the lumen, may be the direct result of organization of inflammatory exudate, or it may be caused by localized weakening of the media and stretching of the aorta. It is generally agreed that such stretching can stimulate diffuse intimal proliferation. Many years ago, Thoma carried this observation to its extreme, believing that dilatation of an artery is essential to the production of fibrous proliferation in the intima.[82]

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SOCIOMEDICAL PROGRESS

When older physicians need help

ARTHUR BOOKMAN, M.D.
NEW YORK, NEW YORK

Since 1919, the Physicians' Home has helped to maintain aged and indigent physicians and their dependents. Physician applicants averaged 80 years in age; their widows, more than 70. Details are given as to financial status, amount of aid, and age of retirement. Insurance providing benefits starting at 70 would have met the needs of most of our beneficiaries.

◆ The purpose of the Physicians' Home, organized in 1919 under the membership law of the state of New York, is to give financial and other assistance to aged and indigent physicians, their wives, widows, and needy minor children. During its early years, the corporation maintained a physical home for its guests. After some experience it was found that, in most cases, elderly physicians and their dependents did not desire to live segregated and somewhat regimented lives in such a home, but were much happier when maintained in familiar surroundings or with other relatives. For many years, therefore, the granting of beneficial aid has been in the form of direct financial assistance to the beneficiary.

The aid is granted under certain general policies, including the following:

1. The beneficiary is a citizen of the United States, has resided continuously in New York state for ten consecutive years, has had continuous membership in a county medical society of New York state for ten consecutive years, or is the wife, widow, or dependent child of such a physician.

2. Aid is extended to enable maintenance in a moderate and reasonable style of living, but not to the extent of maintaining beneficiaries in their former or customary style of living, nor to enable the beneficiaries to continue to practice or enter new enterprises.

3. Except in exceptional circumstances, aid is not extended in cases requiring institutional treatment or custodial care, nor in cases of mental disease.

4. Aid is not given to individuals if the result would be a lessening of the responsibility to those individuals of other welfare agencies.[1]

As the Physicians' Home is the chief agent for beneficiary work for aged physicians of New York state, it was thought that a summary of its work would be of gerontologic interest.

The Beneficiaries

Records of the 67 beneficiaries of the Physicians' Home were reviewed for the period from its organization in 1919

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through May 1954. These included the records of 36 who had died before the latter date, and of 31 who were alive at that time. The records of this second group are much more complete than those of the earlier group. For instance, family and dependency data are adequate only for the group of those still living.

All applicants for beneficial aid resided in New York state except for one who had moved to Maine. The others lived in 25 of the 62 counties of the state, with 37 in greater New York. All but 14 were native Americans.

Age Distribution

The average age on application by 49 men physicians was 80, with extremes of 63 and 90 years. Only 5 were under 70. The average age of 3 women physicians was also 80 and of the 15 widows of doctors, 71, with extremes of 55 and 91 years.

According to Dickinson's recent table on age distribution of physicians by states,[2] 1.4 per cent of physicians in New York state are 80 years and over, or about 420 in a total of 30,000 physicians listed in the state in 1950. In 1954, among our 31 residents, there were 20 physicians in addition to 11 widows of doctors. The average age at which the physicians had applied for aid was almost 80 years. Thus, less than one-tenth of one per cent of the physicians of the state needed such aid, even granting that some could not qualify under our rules and that a few may not have known of the service we provide.

The age of retirement from practice, as given by 19 men, averaged a little less than 73 years, with extremes of 61 to 88. Seven were still in practice at 63 to 77. Three women retired at an average age of 78—the youngest at 75 and the oldest at 84. These figures agree closely with those in a recent study by Shanes and Havighurst of a group of Chicago physicians whose average age at retirement was 72. The authors found that physicians continue to work long after the arbitrary retirement age of 65 and that, in common with other professional groups, "continued work is not necessarily related to either economic necessity or a desire to fill empty time."[3]

Financial Status

No applicant stated at what age his income became inadequate. Usually there was loss of earnings because of illness of the applicant, coupled with exhaustion of savings.

Thirty-two of the 54 physicians still had some remaining financial assets, with cash and bank deposits ranging from $300 to $1,000. Nine had or had had life insurance, with $2,700 the highest value in any instance. Ten owned their homes, usually heavily mortgaged, and two had other real estate of small value. Twelve doctors had small incomes or pensions ranging from $132 to $750 a year.

Only 17 applicants gave statements of their expense budgets, which ranged from $72 to $262 per month, except two which called for $400 and $417 each. In 1952, retired ministers and their wives estimated the minimum amount on which persons over 65 and in reasonably good health should be asked to live as $1514 for men, $1393 for women, and $2168 for a couple.[4] The expense budgets of our applicants do not differ too much from these figures. The maximum amount of aid extended by the Physicians' Home has been $200 per month.

Fifty-three applicants told how their need of financial help had been met, in whole or in part, before they applied to us. Twenty-eight had been helped by relatives or friends; 10 by pensions, workmen's compensation, or public welfare payments; 7 by personal income, savings, and loans; and 2 by small earnings from practice. Clearly, they had come to the end of their resources when application was made to the Home. Our

records do not tell whether failure to provide adequately for old age was caused by lack of foresight or to an income level too low during the earning years to leave a sufficient margin of savings.

Professional Background

Aside from their private practice, many of our applicants had been prominent figures in the medical profession. Of the 31 who were living at the time of this review, 4 had had teaching positions, 4 had been officers of their county societies, 8 had filled hospital staff positions, one had been administrator of a large hospital, and another had held a government position. As far as could be ascertained, 80 per cent had been wholly or mainly in private practice.

At present, the Home has 30 guests, including one woman physician of 89; 10 men physicians, of whom 6 are in their 80's and 4 in their 70's; and 19 widows, of whom 8 are in their 80's, 6 in their 70's, 1 in the 50's and 1 in the 40's. These beneficiaries receive monthly payments ranging from $50 to $200, with an average of $113 a month.

Comment

It is clear that a guaranteed life income of $200 a month, payable after 70, would have provided for the needs of most of our applicants, without help from the Home or from other sources. This suggests that it would be worthwhile to consider a deferred annuity insurance plan for the membership of the state societies, premiums to begin at 35 or thereabouts, with no benefits payable before 70. Any of the major New York companies would be glad to consider such a plan on a group basis.[5] Any income that might accrue in the future through any government social security or pension plan would reduce the amount that would need to be provided by voluntary insurance and thus reduce the cost of the latter. The need for such provision is more likely to grow than to diminish.

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PRIMARY ANAL LEUKOPLAKIA, a rather uncommon lesion, is precancerous and most frequent in elderly people of either sex. Involvement may be suspected from single or multiple, slightly raised, irregular, marginated, grayish-white, keratinized patches in the anal canal. Histologic examination should be done for diagnosis and proper treatment, which varies with stage of disease. Similar, less harmful conditions must be differentiated, such as kraurosis, lichen sclerosis and atrophicus, scleroderma, lichen planus, and lichenified neurodermatitis.

The early or precancerous phase, with small patches of leukoplakia, will respond to local excision or electrosurgery. If lesions recur, wider removal may be effective. A more complete anoplastic procedure is done for large patches, verrucous, indurated, and ulcerated lesions, or anaplastic changes. Invasive squamous cell cancer requires radical resection of the rectum and inguinal nodes. Leukoplakia does not respond to irradiation.

L. GRODSKY: Leukoplakia of the anus. California Med. 84: 420-423, 1956.

Editorial

The ultimate adventure

JAMES P. WARBASSE, M.D.
WOODS HOLE, MASSACHUSETTS

THE AGED need to know how to die—to approach the great adventure with poise, if not with satisfaction. There is generally free discussion of old age and how to help the aged to live, but the discusion is brought to a certain point, and there it stops. The senescent are instructed how to get the most out of life, but that last period is left untouched as though it did not exist.

The aged person, knowing he is approaching death, should not have to ignore or turn away from the event as though it were shameful or a subject for taboo. He should be free of discomforts —that is his doctor's duty. Then, there yet remains for him something to be found in this greatest of adventures into eternity. First, there is the satisfaction of equanimity. I have seen a dying man who was the only person in the family possessed of sweetness and calm, impressing me as a beautiful sight.

But there is still more to be won from this last experience with life. A doctor friend of mine, after sustaining an operation and recognizing the fatal turn it had taken, said cheerfully to the surgeon, "Well, Tommy, it looks as though we are going to put one over on you!" The spirit of waggery need not perish too soon. Socrates was prompted by his sense of humor to say, "We owe a cock to Esculapius! Be sure it is paid!"

I shall not address myself here to that most horrible product of fantasy, the fear of death. The person who has not feared life need not fear death. The intelligent do not fear sleep, but welcome it as a necessary oblivion at the end of the day. The wise do not lose the desire to sleep, nor the desire to die when the time comes. To be unable to want to die is as bad a predicament as to be unable to want to go to sleep. There are certain inevitable things: sleep cannot be denied, nor death gainsaid.

Nor need we give attention to the horrors of death as depicted by medieval artists or to the excruciating fate of fire for nonbelievers as portrayed in certain religious sects. Strangely, I have rarely seen a person who believed in reward and punishment after death, who, when dying, was sure enough of his belief to find

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comfort in the hope of a blissful hereafter. I have often wished he had a stronger faith. I have been present at the death of persons of great intelligence, whose lives were free of reproach, who believed in no afterlife as visualized by the religious, and who were conscious of approaching death; and in these people I have seen no fear, but apparent calmness and resignation. This is natural and to be expected. A person who, by intellectual processes, has arrived deliberately at a definite conviction, does not easily change his mind. No theory can be drawn from my observations, for undoubtedly people of deep religious faith do die in peace and assurance of a blessed future. It is also true that, in the mental confusion that prevails, at the approach of death, many disbelievers hark back to their youth and call for the symbols once impressed upon the youthful mind. This is commonly the result of bedside urging.

The ancient teaching was that death is a punishment, rather than the result of natural physical law. This unnatural conception of a natural process is made more unpleasant for the dying by the teaching that more terrible suffering still awaits the great mass of the human race after death. The waning consciousness is disturbed by lugubrious mechanical and psychologic devices which engender awe and fear.

These things I must leave undiscussed, for my chief wish is to indicate the possibilities of equipoise and a philosophic attitude toward an inevitable benefaction, for this small world cannot yet accommodate animal life that does not die. I wish to stress that it is possible to meet death cheerfully, as one goes out to meet an approaching friend.

Oliver Goldsmith wrote of his friend Lord Bolingsbroke, "He was constant with himself to the last." William Kingdon Clifford, the mathematician, eager for the good of mankind, followed the events of the day and asked for the public news a few hours before his death.

Clootz, the beloved French Revolutionist, said as he neared the end, "Let me lie under the green grass so that I may be born again. Nature is a good mother who loves to see her children appear and reappear in different forms. Now let me sleep!" D'Albert, founder of the French *Encyclopaedia*, spent his last days in with the presence of friends, while he listened to their conversation, and sometimes enlivened it with pleasantries or stories. "He thought of other subjects than his illness and gave himself to gaiety and amusement."

Lessing, the philosopher, "felt the hand of death was upon him but conversed with his friends with much of his old liveliness." Joking with a friend, a stroke of apoplexy suddenly took him off and "after life's fitful fever he slept."

We must bear in mind that death, commonly recognized as the cessation of heart beat and respiration, is usually caused by constitutional changes producing toxins which paralyze the circulatory and respiratory centers at the base of the brain. Before the two vital centers have become paralyzed, the intellectual centers of the forebrain are usually dulled. The mind is enveloped in the cloudiness of approaching loss of function, so that death is commonly preceded by a period by unconsciousness. The minds that remain clearest are the minds that have been clearest during life.

It is my experience that the provident and intelligent senescent person recognizes death not only as inevitable but as beneficent, and thus views its approach without fear and with calm and approving satisfaction. Such a death can be sweet to the dying and a scene of happiness to the friends who find themselves united to one another more strongly than before. This is the fine legacy death owes the living, and is paid in full by the wise.

The great need for lifelong records of patients

IN A RECENT EDITORIAL in Medical Digest, Dr. Paul W. White emphasizes the need for more knowledge which would enable us to make better prognoses. As he says, often our prognoses are wrong and cause needless worry and anxiety to our patients. For example, there is the case of one of Dr. White's patients who had a bad coronary attack at the age of 51. Today, at 79, the man is still playing 18 holes of golf. This man was unusually fortunate, but all of us physicians should keep remembering that there are cases of this type. Knowledge of such good results can keep us from being unnecessarily pessimistic with coronary patients.

As Dr. White says so well, the professors who are now teaching the doctors of the future and who are doing most of the writing in medical journals and books, seldom get a chance to follow the course of a patient's health for thirty years or so following his visits to a university out-patient department or hospital. Too often charity patients are drifters who soon drop out of sight and can never be found.

The only type of physician who can keep track of his patients for half a lifetime is the generalist whose intelligent and well-established middle-class patients stay with him for many years. The only trouble is that a busy practitioner is usually so overworked that he cannot stop to write the wonderful book on prognosis for which he has so much excellent material. Commonly, also, he does not realize what an opportunity he has to make a real contribution to medicine.

WALTER C. ALVAREZ, M.D.

Does the aging brain commonly deteriorate?

RECENTLY Dr. Ward Halstead, professor of medical psychology in the University of Chicago, used a battery of tests to see if he could detect brain deterioration in two groups of contrasting age. The first group consisted of 95 medical students with an average age of 25 and the second of 165 high-level executives ranging from 30 to 76 years. He concluded that while some brain damage did show up in the older groups, a surprising majority of executives have brains which are intact at least in terms of the higher brain functions.

The medical students had an "impairment index" of 0.5 or less which placed them well within the normal range. The executives with an average age of 50 had an average impairment index about the same as that of the medical students. Only 22 per cent of the executives were found to have an impairment index higher than the highest found among the medical students. There was a positive correlation between the results of the tests and the grade of arteriosclerotic changes in the background of the eyes.

If Dr. Halstead's tests are really indicative of injury to the brain, more work should be done with them. It would be a great boon to industry if a laboratory measure of physical aging of the brain could be found.

And yet, perhaps the best test of all will always be what the man can accomplish in his job.

WALTER C. ALVAREZ, M.D.

BOOK REVIEWS

The Relief of Symptoms

WALTER MODELL, M.D., 1955. Philadelphia: W. B. Saunders Company. 450 pages. $8.00.

The evolution of skills, medical or otherwise, characteristically precedes understanding as to when, where, and why to apply them. Far less thought has been applied to the fundamental objectives of therapy than to technics—medicinal, surgical, nutritional, and psychological. It is therefore refreshing to find a new text concerned with therapeutics in which the goal or objective is sharply conceived. Dr. Modell states: "Today medical literature concentrates on the problem of curing disease. The problem of relieving distress *per se*, receives scant attention . . . relieving distressing symptoms comprises an exceedingly important part of medical care." Staying quite properly within this definite orientation, the text makes no attempt whatever to consider therapeutic measures intended to prevent, cure, assist repair, control or retard disease, or to construct health.

The first portion of this very useful book is devoted to several fundamentally important aspects of medicinal therapy such as the nature of relief; the relationships between symptoms; complaints, and disease; the placebo action of drugs; and the necessity for comprehensive understanding of the actions of drugs. This part of the text *should be read*. To use the book only as a source of reference as to "how to" relieve this or that symptom is to ignore much valuable information. Twenty-four symptoms and means for their amelioration are considered in the major portion of the book. Of course, the list is not all inclusive, although the author claims it includes over 95 per cent of the symptoms which cause patients to seek medical assistance.

The text is essentially a clinical pharmacology. Collaboration with other more versatile clinicians could have overcome this handicap. The text is sound and cautiously avoids many controversial questions. It is good but could be better.

EDWARD J. STIEGLITZ, M.D.
Washington, D. C.

The Dynamics of Aging

ETHEL SABIN SMITH, 1956. New York: W. W. Norton & Company, Inc. 191 pages. $2.95.

This is one of the most sensible and thought-provoking books on the problems of aging that we have seen. It is more of a philosophical discussion than a manual for people who want to know where to retire. Most perceptive is Professor Smith's statement that many elderly people are like the child who keeps saying, "Play with me, read to me, stay with me." Sick persons make similar demands. Obviously everyone should so live in his middle years that when he comes to old age he will not feel the need for being amused and taken care of like a child. He will be able to take care of himself, find books to read, and make new friends.

She discusses the staggering feeling that comes to many old persons when, perhaps after retirement, they feel that they have been cast aside. Perhaps in many ways they have failed to be all they wanted to be. They have had frustrations and disappointments, and now it is too late to do anything about it. These old people tend to try to run the lives of those about them, which of course gets them thoroughly disliked.

In dedicating the book to her husband, Professor Smith says, "We have worked together, read together, talked together so many years I no longer know where his ideas and mine begin." How wonderful if all elderly couples could say this.

She compares a physical disability to a stone wall. One may beat upon it with futile blows until one's hands bleed, or one may crumple before it in despair, or one may keep fighting, trying to circumvent it or to surmount it, and, even if one fails to get past it, one "will be traveling hopefully—which as Robert Louis Stevenson tells us, is better than to arrive."

WALTER C. ALVAREZ, M.D.

Collagen Diseases

JOHN H. TALBOTT, M.D., and R. MOLERES FERRANDIS, M.D., 1956. New York: Grune & Stratton. 232 pages, illustrated. $6.50.

The significance of Dr. Talbott's researches into gout, other arthritides, and the collagen diseases, and his ability as a teacher of clinical medicines are too well known to require comment. This delightful and instructive monograph is an example of the best in clinical literature. Here are beautifully written, brief, but comprehensive, liberally illustrated, and thoroughly documented clinical descriptions of the five major collagen diseases or syndromes: systemic lupus erythematosus, polyarteritis, dermatomyositis, systemic scleroderma, and thrombotic thrombocytopenic purpura.

(Continued on page 472)

Book Reviews

(Continued from page 471)

Dr. Ferrandis is a young Castilian physician, currently a training fellow in arthritis, who assisted Dr. Talbott with an exhaustive study of the literature. Although the bibliography contains over 500 titles, Dr. Talbott states in his preface that somewhat more than five times as many articles were read as are listed in the bibliography. Dr. Ferrandis is also preparing a Spanish translation of the text.

This monograph is unequivocally recommended for authoritative clinical instruction in a group of fairly uncommon but most fascinatingly interesting obscure disorders.

EDWARD J. STIEGLITZ, M.D.
Washington, D. C.

Ciba Foundation Symposium on Experimental Tuberculosis, Bacillus and Host, with Addendum on Experimental Leprosy

Edited by G. E. W. WOLSTENHOLME and MARGARET P. CAMERON, assisted by CECILIA M. O'CONNOR, 1955. Boston: Little, Brown and Company. 396 pages. $9.00.

This volume consists of 26 papers presented and discussed at an international conference sponsored by the Ciba Foundation. Fundamental concepts relating to the experimental aspects of tuberculosis were debated by recognized authorities in the fields of chemistry, pharmacology, pathology, bacteriology, and immunology. The questions and discussions which followed each presentation have been included.

The quantity of abstract knowledge about tuberculosis and the tubercle bacillus which has accumulated over the past decades is impressive. However, the answers and applications to clinical problems and processes, as they relate to tuberculosis, are incomplete and indefinite. The mechanics of host resistance and bacterial pathogenicity are discussed in an informal and entertaining manner, but there seems to be more disagreement than agreement.

The difficulties in purification of protein, polysaccharide, and lipoid fractions of the tubercle bacillus are emphasized. Even an established clinical procedure, the tuberculin test, appears to be dependent upon a local skin reaction which cannot be explained clearly, and the purified protein derivative used as testing material is not a chemically pure product.

This collection of papers with excellent tables and illustrations should be of real value to medical educators and students interested in the basic sciences. The clinician practicing in the field of tuberculosis will be amazed at the gaps in fundamental knowledge of a disease he seems to be controlling so well.

SUMNER S. COHEN, M.D.
Oak Terrace, Minnesota

Management of Disorders of the Autonomic Nervous System

LOUIS T. PALUMBO, M.D., 1955. Chicago: Year Book Publishers, Inc. 186 pages. $5.00.

In his preface, the author states that it is his purpose "to present, in a simple and concise manner, the present knowledge of the anatomy and physiology of the autonomic nervous system and its application to the medical and surgical management of a variety of diseases." This is no mean undertaking. But the writer, in this instance, is no newcomer to the field and proves equal to his task.

After a review of the anatomy, physiology, and pharmacology of the autonomic nervous system and a description of the clinical tests and changes following sympathectomy, he discusses numerous therapeutic applications as they pertain to the extremities, cardiopulmonary system, hypertension, gastrointestinal tract, genitourinary tract, head, and neck. Almost 200 selected references are given and the book is carefully indexed. In some instances, the results of sympathectomy have been appraised still more recently, and the reader may expect occasional revisions here.

This volume will enable the physician to orient himself rapidly in a large and possibly unfamiliar field of disorders, some of which, however, he may encounter with disturbing frequency.

HENRY W. WOLTMAN, M.D.
Rochester, Minnesota

New Books Received

Books and publications received will be listed here each month. Books of special interest to our readers will be reviewed later as space permits.

Therapy of Fungus Diseases: An International Symposium. Edited by THOMAS H. STERNBERG and VICTOR D. NEWCOMER, 1956. Boston: Little, Brown & Co. 337 pages. $7.50.

Diagnosis and Treatment of Vascular Disorders. Edited by SAUL SAMUELS, 1956. Baltimore: Williams & Wilkins Co. 621 pages. $16.00.

Electrocardiography: Fundamentals and Clinical Application. LOUIS WOLFF, 1956. Second edition. Philadelphia: W. B. Saunders Co. 342 pages. $7.00.

The Complete Book of Low Calorie Cooking. LEONARD L. LEVINSON, 1956. New York: Hawthorn Books, Inc., 319 pages. $4.95.

Selected Papers of Joseph W. Mountin, M.D. Joseph W. Mountin Memorial Committee, 1956, 356 pages. $5.00.

Digests
FROM CURRENT LITERATURE

Are Organismal Aging and Aging Death Necessarily the Result of Death of Vital Cells in the Organism?

J. W. STILL. M. Ann. District of Columbia 25: 199-203, 1956.

Increasing knowledge of the physiology of higher organisms emphasizes the importance of the nervous-endocrine control system as the mechanism whereby the billions of cells in the body are maintained in cooperative organized relationship. The nervous control, via the hypothalamus, of the endocrine system makes it clear that the nervous-endocrine system is a single closely coordinated control system.

Experience with the artificial kidney supports the notion that it is really the toxic nerve cells which cause death. Use of the artificial kidney protects the nervous system from the damage of uremia while damaged kidney cells heal or are replaced.

Likewise, the fact that electrocuted individuals are frequently revived by artificial respiration, sometimes aided by cardiac massage, seems adequate proof that electric shock does not destroy the cells of vital nuclei in the thalamus and brain stem but simply throws them into such chaotic confusion that only external artificial restoration of bodily functions can start the machine operating again.

Processes which increase transmission time in the control system by either overloading the center with nervous impulses or sending messages too slowly to keep the center awake will lead to disorganization and destruction of an individual without actual destruction of vital cells.

Much of our current knowledge and practice readily fit the control theory of aging and may direct more critical study of this problem.

Human Cerebral Blood Flow and Oxygen Consumption as Related to Aging

S. S. KETY. J. Chronic Dis. 13: 478-486, 1956.

There is possible correlation of cerebral circulation and oxygen ultilization with the dynamics of aging in the brain. Measurements were obtained with the nitrous oxide technic, which yields an average value of blood flow per minute per unit weight of brain. During the first decade of life, the cerebral blood flow and oxygen consumption are quite high—the latter value representing approximately 48 per cent of the total oxygen metabolized by a child under basal conditions. A rapid fall in both measurements occurs near the age of puberty, then there is a more gradual but continuous decline from the third decade through middle and old age.

A reciprocal pattern is seen in cerebrovascular resistance during life. No change in hemodynamics or metabolism was observed in children with previous history of mild convulsive disorders, in adult schizophrenics, or in elderly individuals with varying degrees of mental deterioration.

Since anxiety may be associated with significant increases in cerebral oxygen need and circulation, this was minimized in children by the use of "space domes" instead of face masks, projection of animated cartoons during the procedure, and by the discontinuance of testing at the first sign of uncooperativeness.

There appears to be no significant relationship between loss of mental acuity and decrease in the two measured factors. Furthermore, no meaningful drop in oxygen consumption was seen to perceptively affect the mental state in acutely induced anoxia or hypotension of significant degree. However, these determinations represent the sum total of cerebral circulation and metabolism and do not distinguish between cellular or extracellular active or inert masses. The circulatory deficit may be a gradual process with the metabolic and functional sequelae occurring many years later.

Changes in Lens Proteins of Rats During Aging

Z. DISCHE, E. BORENFREUND, and G. ZELMENIS. Arch. Ophthmal. 55: 471-483, 1956.

Changes in the lens of humans and animals are conspicuous symptoms of the aging process in the animal body. An investigation of the differences in solubility and content of cystine and cysteine of the lens proteins was carried out on rats, aged from thirty-five to one thousand sixty days.

Total lens proteins increased throughout the life span of the rat, as did the albuminoid fraction. Three stages of lens growth were apparent. The first, from birth to the twentieth week, showed a doubling of the weight of the

lens with a concomitant sharp rise in soluble lens protein from 6.5 to 13.0 mg. From the twentieth week to the end of the first year, soluble protein increased more slowly and, after the end of the second year, sharply decreased.

The insoluble lens protein, albuminoid, increased from less than 1 mg. at five weeks to 15 or 16 mg. after one thousand days.

The sum of cysteine and cystine was about the same in both protein fractions in animals less than twenty weeks old. Thereafter, a continuous decline in this sum occurred in the soluble proteins but not in the albuminoid.

Albuminoid in mature animals contains almost equal quantities of cysteine and cystine but soluble proteins lack significant amounts of cystine. Possibly albuminoid is formed at the expense of the soluble proteins and the increase of cystine during the lifetime is caused by oxidation of the original cysteine present in the lens. Further analysis of the amino acid composition of lens proteins is needed to learn more about the complex synthetic processes occurring after the oxidation of soluble proteins. The formation of albuminoid appears to involve more than a direct precipitation after oxidation.

Aged in Connecticut State Mental Hospitals: Study of Persons Over Sixty Years of Age at Three Connecticut State Mental Hospitals

S. SHINDELL and E. CORNFIELD. J.A.M.A. 160: 1121-1125, 1956.

There are few geriatric cases in state mental institutions suitable for transfer to hospitals for the aged or chronically ill. A random sample of patients 60 or over in three state mental institutions was evaluated by chart review, staff interview, and, in most cases, direct examination. Need for continued care in a psychiatric institution was determined by: suicide risk; escape risk; assaultive or destructive behavior; abusive language or unduly disturbing profanity; noisiness; untidiness with excreta; inability to understand simple instructions; inability to communicate basic needs; resistance to hospital routines, such as taking medicines, bathing, or keeping covered with bedclothes; or obvious symptoms of mental illness such as delusions, hallucinations, or hyperactivity. In no case was physical illness a factor in the classification. Only 30 per cent of the sample were found suitable for transfer.

Of the 126 patients acceptable for transfer, 42 were considered poor risks by the mental hospital staff because of grave psychiatric prognosis. An additional 33 were not available for transfer because the family refused consent or the patient was already living outside the institution. Of the over-60 sample, 11 per cent were finally available for transfer to other hospitals. Some of the patients later showed unsuitable behavior warranting return to the mental hospital.

The aged patients in mental hospitals adaptable to outside care comprise 6.5 per cent of the mental hospital population. Over one-half of these patients have already been removed although carried on the hospital census. Care of senile patients belonging in other institutions has not contributed substantially to crowding in state mental hospitals.

Isotopic Determination of Blood Volume

D. M. SKLAROFF. Am. J. Roentgenol. 75: 1082-1083, 1956.

Blood volume determinations, using radioactive iodinated human serum albumin, show a gradual decrease with advancing age. Calibrated syringes are used to measure the iodo albumin for injection. A known volume (20 cc.) with a known radioactivity (about 12 mc) is injected intravenously. This amount is well below the usual 100 mc tracer dose of I^{131}. Ten minutes later a sample of blood is withdrawn in a heparinized syringe from a vein other than the one used for injection. A 2-cc. sample of whole blood is counted and the remainder is centrifuged. The activity of 2 cc. of plasma is then determined in the well scintillation counter. From these values and the hematocrit, blood volume is easily evaluated.

Values obtained by this method are lower than those generally given for normal adults. Total blood volume is 82.3 cc./kg. and total plasma volume 48.9 cc./kg. There is a gradual decrease of the average blood and plasma volume with increased age and elderly patients may have serious blood volume deficits which are not disclosed by ordinary routine laboratory tests.

Structural Alterations with Aging in the Nervous System

W. ANDREW. J. Chronic Dis. 3: 575-596, 1956.

Evidence of both degeneration and defense reactions against senescence are found in human and animal neurons. Degeneration produces jagged, shrunken cells with changes in nucleus, cytoplasm, processes, and relation with satellites. The nucleus becomes elongated or irregular in outline and is pushed to one side of the cell by cytoplasmic accumulations. The nucleolus is pale in older cells. In the cytoplasm, Nissl substance fades, fat globules collect, neurofibrils show dissolutions, and Golgi apparatus and mitachondria become granular. Lipofuscin, a brown pigment similar to the ceroid sub-

stance in cirrhotic livers, appears in granules or vacuoles. The dendrites proliferate. Satellite cells become more plentiful, sometimes appearing to digest the neurone and incorporate the pigments. Various functional groups of nerve cells show specificity in time of onset, degree, and type of senescent change.

Reactive phenomena appear to combat dissolution of aging cells in some parts of the nervous system. Although some degenerative changes occur in the supraoptic and paraventricular nuclei of the hypothalamus, no cell destruction can be demonstrated. In these nuclei, the cells increase eight to ten times in size, the nuclei and nucleoli divide, and the nucleus is very basophilic. The substantia nigra and Purkinje cells of the cerebellum also show amitotic division of nuclei.

In seeking means to retard or ameliorate the aging process, medical science can strive not only to combat the natural degenerative processes, but also to aid the equally natural defense phenomena.

Incidence and Onset of Pulmonary Tuberculosis in Old Men

E. GORDON WILKINS. Brit. M. J. 4972: 883-886, 1956.

In England and Wales notification rates per 100,000 of respiratory tuberculosis in men over 65 have risen from about 50 to over 80 since 1938, although for women of the same age they have remained around 17.

Mortality rates for respiratory tuberculosis for persons over 65 show a rise from 58 in 1938 to a peak of 81 in 1951 for men, but a steady decline from 22 to 13 for women.

Many old men have physical signs of bronchitis, sometimes modified by emphysema. Instead of having their chest symptoms attributed to smoking or bronchitis, all old men with persistent cough should be regularly radiographed and any chest infection followed to radiologic resolution. Even apparently inactive lesions should be watched with suspicion and sputum examination should be made regularly. Weight loss is often considered a normal accompaniment of age, but may be either a symptom or predisposing cause of reactivation.

The effects of intercurrent disease in causing reactivation are well illustrated. Anemia, whether nutritional or due to chronic blood loss, is especially apt to be missed in old age. Finally, latent chest lesions are often brought to light by reactivation after major surgery, which emphasizes the need for routine preoperative chest radiography.

The incidence and death rates from pulmonary tuberculosis in men over 65 have risen to approximately five times that found in women.

Arthritis in the Elderly Patient (Osteoarthritis)

J. J. BUNIM. Bull. New York Acad. Med. 32: 102-114, 1956.

The single most effective treatment for degenerative joint disease is assurance designed to offset fears of impending invalidism or crippling deformity. Only if a specific deficiency exists should hormonal therapy be instituted. Occasionally intraarticular injections of 25 mg. of tertiary-butylacetate or acetate of hydrocortisone is helpful in alleviating pain.

Primary osteoarthritis appears spontaneously with advancing age, whereas the secondary form may occur at any time of life as a consequence of fracture, infection, or other injury which ultimately leads to degeneration of articular hyaline cartilage.

This condition, which is the most common type of chronic arthritis, was the second most frequent musculoskeletal disorder in a sample industrial population of 23,881 predominately middle-aged male workers, and was exceeded only by bursitis. The spine was affected in nearly three-fourths of the cases. No correlation of age and severity of cartilage damage was seen.

The treatment of osteoarthritis and rheumatoid arthritis varies greatly, so accurate differentiation must be made. The former is a degenerative disease, while the latter is primarily inflammatory in nature. Consequently, manifestations as fever, leukocytosis, weight loss, anorexia, anemia, hyperglobulinemia, or elevated sedimentation rate are not seen with osteoarthritis. The affected peripheral joints are stiff, painful, tender, bony, and irregular without redness, heat, or periarticular swelling. Subcutaneous nodules are not noted, and sheep cell agglutination is negative.

The Effect of ACTH Administration on the Urinary Excretion of Androgens and Other Steroids by Old Men in Comparison with Young Men: Preliminary Report

D. A. MAC FARLANE, C. B. LEMAN, P. L. MUNSON, and J. H. HARRISON. J. Urol. 75: 558-561, 1956.

Quantitative determinations of androgens, 17-hydroxycorticoids, and 17-ketosteroids were made on 5 men between 20 and 30 and on 5 men between 65 and 87. A control period of three consecutive days was followed by a test period during which 20 clinical units of ACTH in gelatin was given for two days followed by a higher dosage of 80 units for two more days. The study was repeated after an interval of two to three weeks.

Increased excretion of 17-hydroxycorticoids and 17-ketosteroids was observed on both age groups following both low and high dosage of ACTH, with the older men excreting a higher

amount of steroid. Androgen excretion was unchanged with low dose of ACTH, while, with the high dose, the younger men excreted over twice as much androgen as the older men.

In a second group of patients, a continuous infusion containing 25 U.S.P. units of ACTH was given over an eight-hour period on two consecutive days to 4 men between 19 to 34 and to 4 men between 65 and 76. Both groups responded with increased steroid excretion, but the levels in the younger men were higher than in the older men.

Pregnancy After Forty-four

E. F. STANTON. Am. J. Obst., & Gynec. 71: 270-284, 1956.

Term pregnancy is uncommon in women 44 years or over. A study of 237 pregnancies in women over 44 was made in a total series of 71,827 pregnancies—an incidence of 1 in 303. The following conclusions are noted:

1. Spontaneous delivery in this elderly group occurs about as often as in the over-all series. Cesarean section is employed with more than twice the usual frequency, however.
2. Prolonged labor over thirty hours is about ten times as frequent in these cases.
3. Toxemia is 3 times as common as in the entire series and severe pre-eclampsia occurs nine times as often.
4. The incidence of hydatid mole is more than 20 times that usually encountered.
5. Infants of excessive size, over 4,000 grams, are twice as common among the older mothers.
6. Stillbirth and neonatal death rate is about 9 times the over-all annual incidence.
7. Incidence of mongolism and congenital abnormalities incompatible with life is about 4 per cent, or approximately 8 times the over-all annual incidence.
8. Incidence of viable births after age 47 is 1 in 11,000 deliveries; after 50, a viable birth practically never occurs.

Fluid and Electrolyte Problems in the Surgery of the Aged

K. E. ROBERTS, J. J. DE COSSE, and H. T. RANDALL. Bull. New York Acad. Med. 32: 180-190, 1956.

Early recognition and treatment of acid-base imbalance in elderly surgical patients are important.

Vigorous bowel purgation preoperatively with poorly absorbed solutions such as magnesium sulphate frequently results in hyperchloremic acidosis and negative potassium balance. Oral or intravenous administration of 200 mEq. of sodium bicarbonate or lactate is usually sufficient to rectify this state.

Contracted blood volume may be corrected by small, daily 250-cc. transfusions so that cardiac failure from too vigorous replacement may be minimized.

The extracellular expansion of water with shifts in electrolytes in the first few days after surgery is followed by diuresis and excretion of sodium. The specific gravity of urine is of prime importance in differentiating postoperative renal shut-down from dehydration. A high value is associated with dehydration and low levels are seen with renal dysfunction. A stable or rising hematocrit, fixed or slightly elevated BUN, sodium or potassium are all consistent with poor hydration. With renal shut-down, the hematocrit and protein may drop, whereas the plasma electrolytes decrease and the blood nitrogen rises rapidly.

As atelectasis and pulmonary complications are common causes of death in the elderly postoperative patient, respiratory acidosis must be recognized as a reflection of anoxia, and vigorous efforts made to increase ventilation with frequent suctioning, use of bronchodilators, expectorants, and early ambulation. Narcotics should be used sparingly.

A Psychiatric Study of Attempted Suicide in Persons Over Sixty Years of Age

P. O'NEAL, E. ROBINS, and E. H. SCHMIDT. Arch. Neurol. & Psychiat. 75: 275-284, 1956.

Evident psychiatric illness, usually psychotic, has been found in every elderly patient attempting suicide.

Immediately following a suicide try, 19 patients over 60 and 90 younger patients were interviewed and examined. All the elderly patients had diagnosable mental illness, while 23 per cent of the younger patients had no definite psychiatric pathology. Psychoses predominated in the older age group—9 patients had psychotic depression; 5, either senile psychosis or cerebral arteriosclerosis; and 3, toxic psychosis.

Social factors such as loneliness, enforced unemployment, or serious physical illness may precipitate suicide in a patient already mentally ill, though two-thirds of the patients had illnesses which could not have been triggered by social factors peculiar to old age. Social factors alone are probably not sufficient to impel an older person to try suicide.

Attempts made by elderly patients are usually genuine, while younger patients more often use inadequate methods. Most elderly patients suffer from treatable or reversible disease. Therefore, hospitalization is indicated for elderly patients to prevent suicide and treat the underlying illness. Many patients over 60 may be returned to society as useful citizens.

relaxes both the body and the mind

well suited for prolonged therapy

- well tolerated, nonaddictive, essentially nontoxic
- no blood dyscrasias, liver toxicity, Parkinson-like syndrome or nasal stuffiness
- chemically unrelated to chlorpromazine or reserpine
- does not produce significant depression
- orally effective within 30 minutes for a period of 6 hours

Indications: **anxiety and tension states, muscle spasm.**

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2-methyl-2-n-propyl-1,3-propanediol dicarbamate—U.S. Patent 2,724,720

SUPPLIED: *400 mg. scored tablets. Usual dose: 1 or 2 tablets t.i.d.*

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supplies essential nutrients for 24 hours!

To prepare, mix 1 quart whole milk
3 cups (405 Gm.) non-fat milk powder
4 heaping tablespoons (60 Gm.) GEVRAL PROTEIN
Supplement water to make 2,000 cc.

This formula supplies:

Liquid.....	2,000 cc.
Protein.....	217 Gm.
Fat.....	42 Gm.
Carbohydrate..	273 Gm.
Calories	2,354

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PROTEIN**

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Activities and Announcements . . .

Coming Meetings

The fifth annual *Capital District Conference on Aging* will be held on Thursday afternoon, October 25, 1956, at the Ann Lee Home, Watervliet, New York. Theme for the Conference will be "Volunteer Action for Aging," and workshops will be held on the subjects of "Volunteers for Aging," and "Institutional and Patient Care."

The ninth annual scientific meeting of the *Gerontological Society, Inc.* will be held at the Hotel Hamilton, Chicago, November 8 through 10, 1956. Edward J. Stieglitz, 1726 Eye Street, N.W., Washington 6, D.C., is program chairman. The theme of the meeting will be "Preparation for Senescence."

The *American Society for the Study of Arteriosclerosis* will hold its annual meeting at the Palmer House, Chicago, November 11 and 12, 1956. Dr. R. Gordon Gould, Los Alamos, New Mexico, is program chairman.

The first *Governor's Conference on Aging* in Minnesota will be held at the Radisson Hotel in Minneapolis, November 26 and 27.

The Fourth Congress of the *International Association of Gerontology* will be held in Merano, Italy, July 14 to 19, 1957. For registration forms and further information, write to the secretary, Quarto Congresso Internazionale de Gerontologia, Viale Morgagni, 85, Firenze, Italy. Additional information regarding the program will be found in the later issues of *Geriatrics*.

•

Architectural Competition in Homes for the Aged

The National Social Welfare Assembly, Inc., 345 E. 46th Street, New York 17, is sponsoring an architectural competition in homes for the aged. This contest is made possible by a grant from the Frederick and Amelia Schimper Foundation. First prize is $5,000 with five additional prizes ranging from $2,500 to $500.

•

Booklets on Services to Older People

The American Public Welfare Association has issued a number of useful booklets and pamphlets on services to older people. For a list of publications and schedule of prices write to the association at 1313 East 60th Street, Chicago.

(Continued on page 51A)

For Safe, Normal Sleep in the **AGED**

PERICLOR®

petrichloral (pentaerythritol chloral)

CAPSULES

Barbiturates have presented serious disadvantages when used in the aged. For example, Moore[1] found that: "Phenobarbital at times, particularly in older patients, may produce excitement, dizziness, confusion and, in certain patients, an organic kind of psychosis."

After using PERICLOR—in 108 patients—Gatski[2] found that: "With . . . [PERICLOR] an average of two hours more sleep was obtained with one-third to one-half the usual dosage of chloral hydrate, and the disadvantages of both chloral hydrate and the barbiturates were avoided."

Gatski concluded: "No untoward systemic or other side actions have occurred; hence the preparation may be used in the presence of heart, liver and kidney damage, and in alcoholic rehabilitation. . . . One of the great advantages of this drug . . . is the safety factor."

Available on prescription only.

1. Moore, F.J.: West Virginia M.J. *49*:292 (Oct.) 1953.
2. Gatski, R.L.: Am. Pract. & Dig. Treat. *6*:1885 (Dec.) 1955.

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Superficial skin complaints usually respond dramatically to TASHAN CREAM 'Roche'

Antiprurient, soothing, and healing—contains vitamins A, D, E, and *d*-Panthenol, in a cosmetically pleasing water-soluble base which fastidious patients will enjoy using. Hoffmann-La Roche Inc., Nutley, N. J.

TASHAN [T.M.]

Activities and Announcements . . .

(Continued from page 48A)

Film on Aging

"A Place to Live," a new documentary film based on the story of an elderly father who must be taken into the home of an adult couple with young children, is procurable on loan from the Wm. S. Merrell Company, Geriatric Film Library, Cincinnati 15, Ohio. The 16-mm., black-and-white sound film, with a showing time of twenty-four minutes, was prepared by the Committee of Aging of the National Social Welfare Assembly of New York.

•

Essay Award in Urology

The American Urological Association offers an annual award of $1,000—first prize of $500, second prize $300, and third prize $200—for essays on the result of some clinical or laboratory research in urology. Competition is limited to urologists who have been graduated not more than ten years, and to hospital interns and residents doing research work in urology. For full information write the executive secretary, William P. Didusch, 1120 North Charles Street, Baltimore, Maryland. Essays must be in his hands before December 1, 1956.

•

Findings from Cancer Detection Center

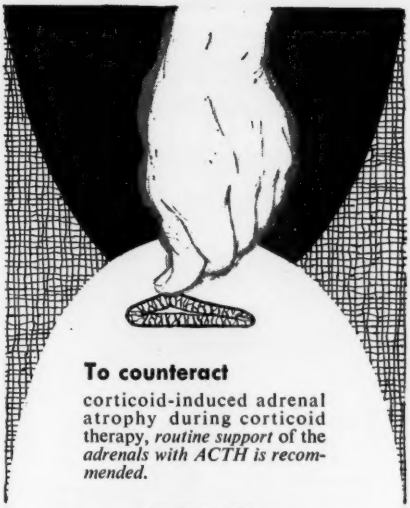
One out of every 39 of the 7,786 apparently well men and women examined in the University of Minnesota's Cancer Detection Center in the last eight years has been found to have cancer, according to a recent report. In the 22,723 examinations of 3,736 men over 50 and 4,050 women over 45 conducted during the eight-year period, physicians discovered 205 cancers, 4,082 precancerous conditions requiring treatment, and 6,997 nonmalignant tumors.

•

Studies in California

The five-year study of the "Impact of an Aging Population," which has been conducted by the Institute of Industrial Relations on the Berkeley Campus of the University of California, is nearing completion. Present plans call for publication of five volumes reporting the study in 1956 and early 1957.

The Fund for Adult Education and the Division of Gerontology of the University of Michigan have selected five California colleges to test their material for discussion groups on the subject, "Aging in the Modern World." Dr. Wilma Donahue of the University of Michigan is in charge of the project and Clark Tibbitts, chairman of the Committee on Aging of the U. S. Department of Health, Education, and Welfare, is the editor in charge of developing the material to be used.



To counteract

corticoid-induced adrenal atrophy during corticoid therapy, *routine support* of the *adrenals with ACTH is recommended.*

THIS IS THE PROTECTIVE DOSAGE RECOMMENDATION FOR COMBINED CORTICOID-ACTH THERAPY

- When using *prednisone* or *prednisolone:* for every 100 mg. given, inject approximately 100 to 120 units of HP* ACTHAR *Gel.*
- When using *hydrocortisone:* for every 200 to 300 mg. given, inject approximately 100 units of HP* ACTHAR *Gel.*
- When using *cortisone:* for every 400 mg. given, inject approximately 100 units of HP*ACTHAR *Gel.*

Discontinue administration of corticoids on the day of the HP*ACTHAR *Gel* injection.

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(IN GELATIN)

The Armour Laboratories brand of purified adrenocorticotropic hormone—corticotropin (ACTH)

*Highly Purified

Unsurpassed in Safety and Efficacy
More than 42,000,000 doses of ACTH have been given

THE ARMOUR LABORATORIES
A DIVISION OF ARMOUR AND COMPANY
KANKAKEE, ILLINOIS

Manufacturers' Activities . . .

Tranquilizer with Safety Factor

A new product, Tablets Renir, reserpine with an added safety factor, has been designed by the S. E. Massengill Company, Bristol, Tennessee, to provide the desired action of reserpine, counterbalanced by the well-known effects of ephedrine, and to offer optimum therapy for hypertension. Untoward reactions are minimized, and tranquilization is maintained. It is indicated in treatment of hypertension as well as anxiety, tension, and neurosis.

•

New Wheel Chair Series

A completely new line of Hollywood folding wheel chairs is announced by Everest & Jennings, Inc., Los Angeles. These chairs are strengthened by all-welded construction and finished with improved chrome plating. The slight rearward tilt of seat and adjustable footrests provide greater patient comfort, and the chairs require only finger-tip pressure to fold. Standard footrests are interchangeable with elevating legrests, and may be converted without tools.

•

Doxinate for Spastic Constipation

The use of Doxinate, dioctyl sodium sulfosuccinate, a new fecal softener manufactured by Lloyd Brothers, Inc., Cincinnati, was studied in a series of 47 coloproctologic patients. The results, as reported in the June issue of *The Journal-Lancet* were very good in 18 out of 24 patients with spastic constipation, fair in 3, and poor in 3 others. Nine of 12 patients given the compound after anorectal surgery had one or two soft, formed stools daily with little distress and no side effects.

•

Company Celebrates Seventy-fifth Anniversary

A bronze medallion, created by sculptor A. S. Hardin, commemorates the seventy-fifth anniversary of Thos. Leeming & Company, New York. The company was founded in 1881 as an importer and promoter of pharmaceutical specialties of European origin, but has since developed a long-range program of domestic pharmaceutical research.

•

Additive Vial Available

A device for adding supplemental medication to bulk parenteral solutions has been developed by Travenol Laboratories, Inc., pharmaceutical

(Continued on page 54A)

to balance the bland diet...

Ovaltine with milk, included in the "bland" or special diet, helps to balance and satisfy the complete nutritional requirements of the patient. By increasing levels of nutrients which are deficient in milk, Ovaltine assures that minimum daily requirements of B vitamins, ascorbic acid and iron are met.

Ovaltine adds zest and appeal to the unappetizing, uninteresting restricted menu. Its balanced protein, vitamin and mineral formula favors weight gain, increases resistance and helps combat the strain of today's stepped-up living.

Ovaltine is equally tempting hot or cold. This refreshing beverage may be taken at mealtimes, during "break" periods, or as a sleep inducing nightcap. Because it reduces the curd tension of milk over 60%, Ovaltine is easily digested and kind to sensitive stomachs.

OVALTINE®

The World's Most Popular Fortified Food Beverage

The Wander Company, 105 W. Adams St., Chicago 3, Ill.

Manufacturers' Activities . . .

(Continued from page 52A)

products division of Baxter Laboratories, Inc., Morton Grove, Illinois. Called Incert, the new vial permits direct, aseptic transfer of medication without use of needle and syringe. Five liquid or dried medications are currently available in additive vials: B vitamins with C, succinylcholine chloride, potassium chloride, potassium phosphate, and calcium levulinate.

•

Tranquilizer for Rheumatic Disease

Eighty-six of 100 patients with rheumatic diseases, particularly those types characterized by fibrositis symptoms, were benefited by the tranquilizer, Miltown, made by Wallace Laboratories, New Brunswick, New Jersey, according to tests conducted at Benjamin Franklin Clinic, Philadelphia. In 54 cases, degree of improvement was termed "excellent." Most patients obtained relief from stiffness and pain within twenty to thirty minutes after taking Miltown. Normal dosage was one tablet three or four times a day.

•

Film on Rehabilitation of Aging

"Still Going Places," a 16-mm., black-and-white, documentary film on rehabilitation of the aged, is available free, on three weeks' advance notice, from Film Library, Pfizer Laboratories, 630 Flushing Avenue, Brooklyn, New York.

•

Tissue Building Product for Surgical Patients

A new tissue building drug, Nilevar, has been announced by G. D. Searle & Co., Skokie, Illinois. Clinical studies in 30 medical centers in the United States and England show that the drug is useful in: (1) assisting recovery following major surgery; (2) assisting in preoperative preparation of patients who are in poor condition; (3) improving nutrition of patients with severe illnesses such as polio; (4) as an aid in arresting the wasting of patients with lingering illnesses; and (5) helping in the strengthening of premature infants.

•

New Dosage Form

Elixir Butiserpine, made by the McNeil Laboratories, Inc., Philadelphia, is a dosage form combining the intermediate sedative, Butisol Sodium, with the tranquilizer, reserpine, to augment the clinically established benefits produced by Butisol Sodium alone. It provides safe and adequate control for the majority of patients with mild to moderate essential hypertension without the side effects produced by the more potent antihypertensive drugs.

Rx Information

Meratran

"Premature retirement and the fear of impending deterioration and death often create a serious mental depression in the older but otherwise organically fit individual. It is difficult to inspire them to continue normal activities." Following this statement, Pomeranze[1] reported: Meratran *". . . has suggested itself as valuable for stimulating a greater zest for living in the older depressed patient."*

Meratran revives the depressed elderly patient's alertness, and a better interest in otherwise dull, routine activities is encouraged.

The effectiveness of Meratran is prolonged — at least 24 hours. The necessity for repeated doses and constant observation of drug taking is obviated. The drug produces little or no insomnia and no appreciable effect on respiration or pulse rate. Urine examinations, blood counts and liver function tests remain normal.

Dosage: *Geriatric Patients*—1 mg. Meratran once or twice daily. Observe patient response, adjust dosage to individual needs.

Contraindications: Meratran is contraindicated in agitated prepsychotic patients, paranoia or in certain other cases such as obsessive-compulsive states.

When Anxiety and Tension Are Present — Meratran with Reserpine, 1 tablet once or twice daily.

Supplied: *Meratran* (pipradrol) Hydrochloride tablets 1.0 mg. (pink tablets) in bottles of 100 and 1,000. Also available in 2.5 mg. (yellow) tablets. *Meratran with Reserpine,* white tablets containing 1.0 mg. Meratran and 0.25 mg. reserpine, in bottles of 100.

References: 1. Pomeranze, J.: J. Gerontol. 9:486, 1954. 2. Kleemeier, R. W.; Rich, T. A., and Justiss, W. A.: J. Gerontol. 11:165, 1956. 3. Brown, B. B., and Werner, H. W.: Federation Proc. 12:304, 1953. 4. Brown, B. B., and Werner, H. W.: J. Pharmacol. & Exper. Therap. 110:180, 1954. 5. Blohm, T. R., et al.: Federation Proc. 13:337, 1954. 6. Antos, R. J.: Arizona Med. 11:397, 1954.

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TRADEMARKS: 'MERATRAN WITH RESERPINE', MERATRAN®

brings elderly patients back from indifference, depression

not with a jolt...but with gentleness

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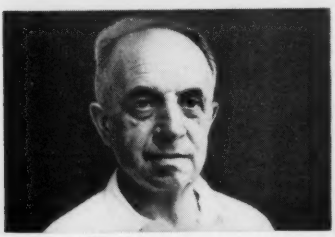
pipradrol hydrochloride

65 ♀, indifferent, soiled self, would not attend to simplest personal needs — family contemplated institutionalization.

alertness seen on second day of 1.0 mg. Meratran—resumed old interest in Mission work in 3 weeks—"great improvement . . . has gotten along extremely well."



65 ♂, fatigued, depressed, apathetic after retiring from very active business life.

Meratran gradually reduced from 2.0 mg. daily, to 1.0 mg. every other day, restored interest—". . . feels well and has acquired constructive hobbies."

Actual case histories from personal communication to The Wm. S. Merrell Company. Photos Professionally Posed.

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A New Dietary Management for

CONSTIPATED ELDERLY

A bowel content modifier that softens dry, hard stools by dietary means without side effects.[1] Acts by promoting an abundant fermentative bacteria in the colon, thus producing soft, easily evacuated stools. Retards growth of putrefactive organisms. By maintaining a favorable intestinal flora, Malt Soup Extract provides *corrective therapy for the colon, too!*

DOSE: 2 tablespoonfuls b.i.d. until stools are soft (may take several days), then 1 or 2 Tbs. at bedtime.

*Specially processed malt extract neutralized with potassium carbonate. In 8 oz. and 16 oz. bottles.

1. Cass, L. J. and Frederik, W. S.: Malt Soup Extract as a Bowel Content Modifier in Geriatric Constipation. Journal-Lancet, 73:414 (Oct.) 1953.

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FOR OLDER PATIENTS... *Soothing Relief* IN CHRONIC URINARY INFECTIONS

Urolitia can be given over long periods . . . without toxicity, without irritation, without drug fastness . . . to keep the urine free from E. coli, S. albus, S. aureus. . . . Promptly soothes the irritated membrane while providing bacteriostasis.

DOSE:
One tbs. in half cup warm water, q.i.d., ½ hr. a.c. and h.s.

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METHENAMINE URINARY ANTISEPTIC

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new improved formula!

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In the treatment of all common anemias.

NOW 50% more Ferrous Sulfate
50% more Folic Acid
100% more Vitamin C

ALSO ADDED: ½ U.S.P. Unit of Vitamin B_{12} with intrinsic factor concentrate

THIS IMPROVED FORMULA CONFORMS TO THE MOST MODERN CONCEPT IN HEMATINIC THERAPY

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Each capsule contains:

Ferrous sulfate exsic. (4½ gr.)	300 mg.
Vitamin B_{12} with intrinsic factor concentrate U.S.P.	½ U.S.P. Unit
Vitamin C (ascorbic acid)	100 mg.
Folic acid U.S.P.	1 mg.
Thiamine mononitrate (B_1)	10 mg.

Supplied

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*Moravec, C. L., and Moravec, M. E.: New York J. Med. *55*:2775, 1955.

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[1]Levy, S.: J.A.M.A., 153:1260-1265, 1953.

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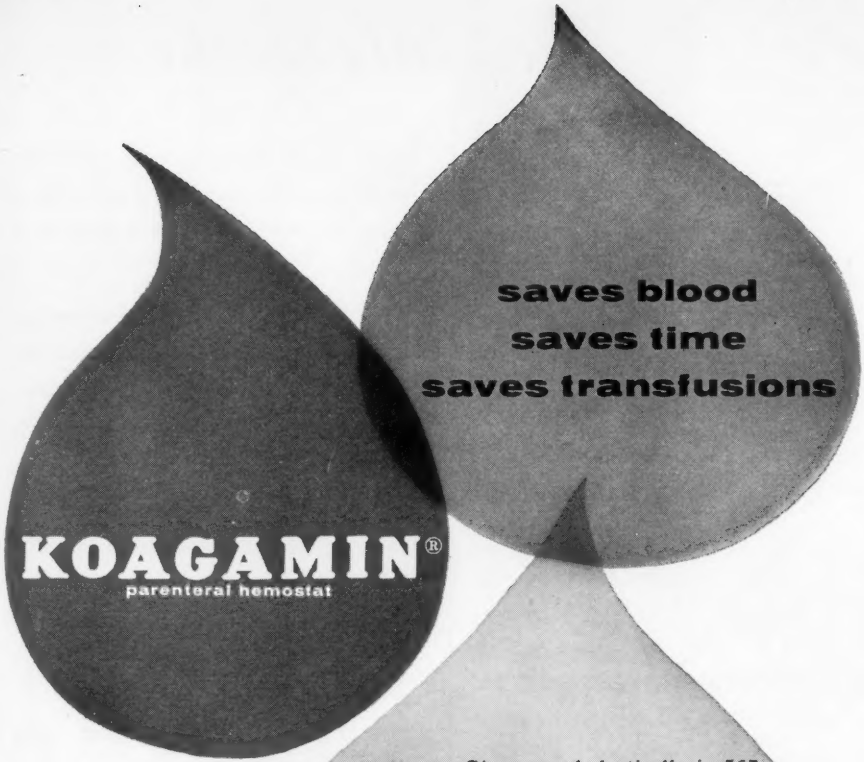

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*Joseph, M.: Am. J. Surg. *87*:905, 1954.

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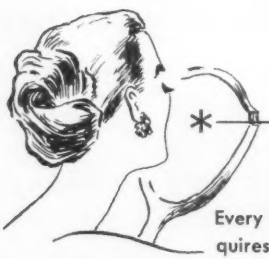

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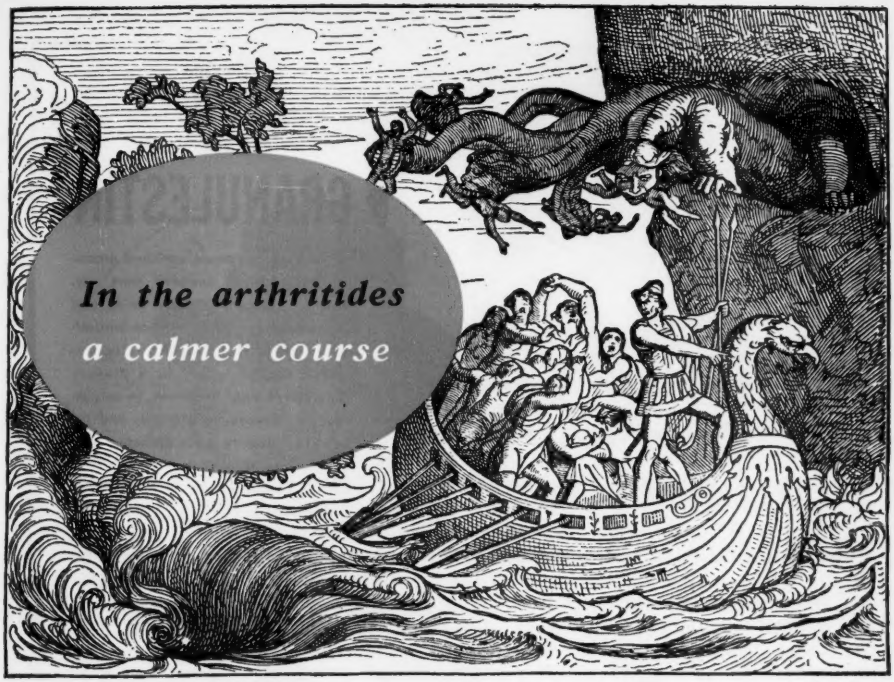

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Because of the complementary action of cortisone and the salicylates, Salcort produces a greater therapeutic response with lower dosage. Side effects are not encountered, and no withdrawal problems have been reported.

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each tablet contains:

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Calcium ascorbate. . . .	60.0 mg.
(equivalent to 50 mg. ascorbic acid)	
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[1]*Busse, E.A.: Treatment of Rheumatoid Arthritis by a Combination of Cortisone and Salicylates. Clinical Med.* 11:*1105*

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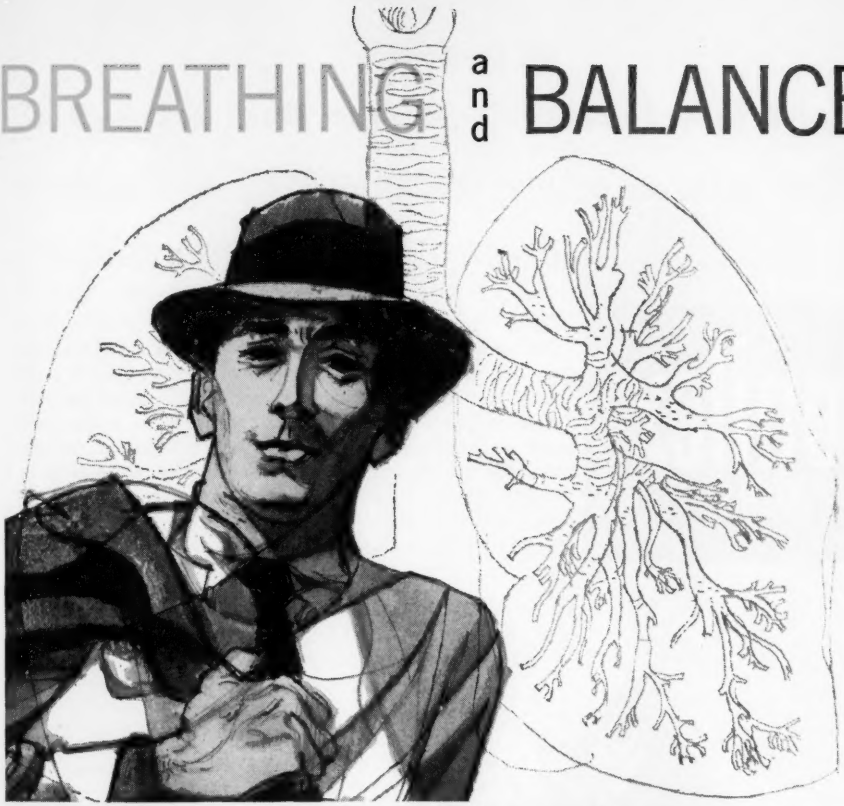

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*Schwartz, E.: New York J. Med. 56:570, 1956.

provides restoration of breathing capacity — Relief of symptoms [bronchospasm, cough, wheezing, dyspnea] is maintained for long periods with relatively small doses.*

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mental clarifier for the aged...

for safe, effective treatment of moderately disturbed aged patients...

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ACTION: Produces both objective and subjective physical improvements, marked behavior improvement, better performance on psychological testing, and increase in intelligence quotient. Restores normal blood lactic acid values and produces more normal electroencephalographic tracings.

DOSAGE: 2 tablets 3 times daily. Lower dosages for maintenance after maximum effect is reached.

SUPPLIED: Furnished in bottles of 96 tablets.

FORMULA:

Pentylenetetrazol	100 mg.
Niacin	50 mg.

Send for literature and samples

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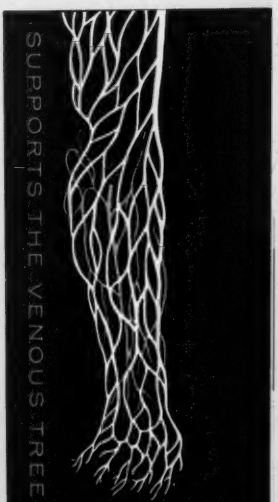

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Mecamylamine Hydrochloride

An oral antihypertensive that is

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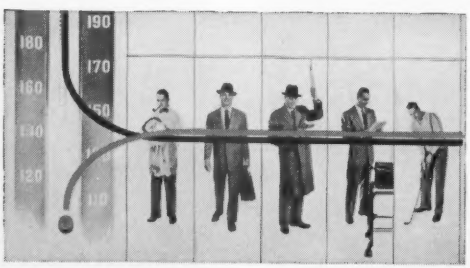

The same dose provides the same results . . . day after day.

'INVERSINE,' a secondary amine, is a new and extremely potent antihypertensive agent. It is totally unlike the poorly and erratically absorbed ganglionic blockers of the quaternary ammonium type and has the following clinically demonstrated properties:

1. *Excellent reproducibility* of effects.
2. *Most potent* of all available oral ganglionic blockers (10 to 20 times more potent than pentolinium and about 90 times more potent than hexamethonium).

3. *Smooth, predictable response:* In a given patient, the same dose of 'INVERSINE' elicits the same blood pressure response, time after time, *with minimal day-to-day fluctuation.*

4. *Remarkable physiologic economy* resulting *in long duration of action, sustained* effect.

5. *Gradual* onset of effect.

6. *Small oral dosage* produces required hypotensive effect.

7. *Effective* even in patients refractory to hexamethonium and other ganglionic blocking agents.

In all these respects, 'INVERSINE' differs greatly from all other available ganglionic blocking agents and is, in effect, in a unique category among antihypertensives.

CLINICAL STUDIES

'INVERSINE' has been used by many investigators on thousands of patients. In all this clinical work, this new and very potent agent has amply fulfilled its laboratory promise. By demonstrating reproducibility, high potency and smooth effectiveness with minimal fluctuation – all resulting directly from its complete absorption from the gastrointestinal tract – 'INVERSINE' has successfully circumvented many of the objections to the use of ganglionic blockade in hypertension.

In the opinion of one reviewer ". . . the most useful ganglionic blocking agent to be introduced is mecamylamine ('INVERSINE'). . . . This drug is completely absorbed when given by mouth and has such a gradual onset and offset of action that a continuous and effective level of blockade can readily be achieved. . . ."[1]

Further, in one of many clinical trials,† "The over-all response rate was 92%, and 24% of the patients became normotensive."[2] Investigators have found 'INVERSINE' to be ". . . the most potent and effective of the three drugs in reducing the blood pressure. . . ." ['INVERSINE' and two other ganglionic blocking agents.][2]

Moreover, following ganglionic blockade with 'INVERSINE,' some patients with hypertension may experience relief of pre-existing headache and angina pectoris. Many patients with retinopathy, congestive heart failure and electrocardiographic abnormalities, have shown signs of improvement during treatment with 'INVERSINE.'

'INVERSINE' was thus shown to be most valuable in the management of hypertensive vascular disease.

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'INVERSINE' (mecamylamine), though comparatively nontoxic, is a very potent agent which must be used with care. Side effects observed during clinical use are due to excessive pharmacologic action. They may be minimized by careful adjustment of dosage and close supervision of the patient.

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Judged by any standard 'INVERSINE' (mecamylamine) is the most satisfactory agent in the treatment of hypertension by ganglionic blockade. It is the most potent and most reliable oral agent for the management of hypertension.

References:

1. Sturgis, C. C., et al.: Advances in Internal Medicine, J. Michigan M. Soc. *55*:154 (Feb.) 1956.

2. Moyer, J. H. et al.: Drug Therapy of Hypertension: Preliminary Observations on the Clinical Use of Mecamylamine (A Ganglionic Blocking Agent) in Combination with Rauwolfia for the Treatment of Hypertension. Med. Rec. & Ann. *49*:390 (Sept.) 1955.

† In this clinical trial all patients were given, in addition to one of the ganglionic blocking agents, a constant daily amount of reserpine.

'INVERSINE' is the trademark of Merck & Co., Inc.

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DIVISION OF MERCK & CO., INC., PHILADELPHIA 1, PA.

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Suspended with methylcellulose 1.25%

Supplied:

6-fluidounce and pint bottles

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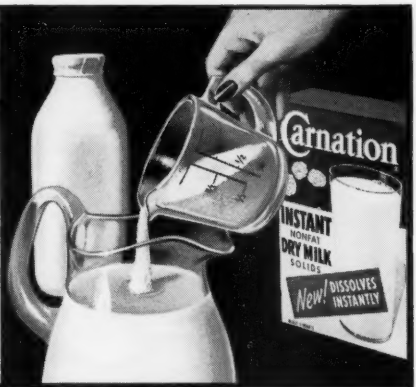
How CARNATION INSTANT provides new dietary advantages not possible with other forms of nonfat milk

Because Carnation Instant is a new *crystal form* of nonfat dry milk, the physician may specify a greater ratio of milk solids to water than supplied by bottled nonfat milk. The new crystal form may also be added to *whole* milk to increase its nutritive content.



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the physician may specify an additional heaping tablespoon of Carnation crystals per glass (or ⅓ cup additional crystals per quart.) This "self-enrichment" provides a 25% increase in protein, calcium and B-vitamins with no increase in liquid bulk.

25% "self-enriched" Carnation Instant also provides a more familiar heavier texture and richer flavor, well-liked by patients who are accustomed to drinking whole milk.

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the physician may recommend the addition of 1⅓ cups Carnation crystals to each quart of *whole* milk. This *doubles* the protein, calcium and B-vitamin content.

The use of Carnation Instant in whole milk is of value when some fat is advisable but liquids should be restricted... and is also useful in increasing the protein in geriatric or convalescent diet without increasing fat or liquid bulk.

Other advantages of the Carnation exclusive Crystal Form

Fresh milk flavor, delicious for drinking.
Mixes instantly in ice-cold water.
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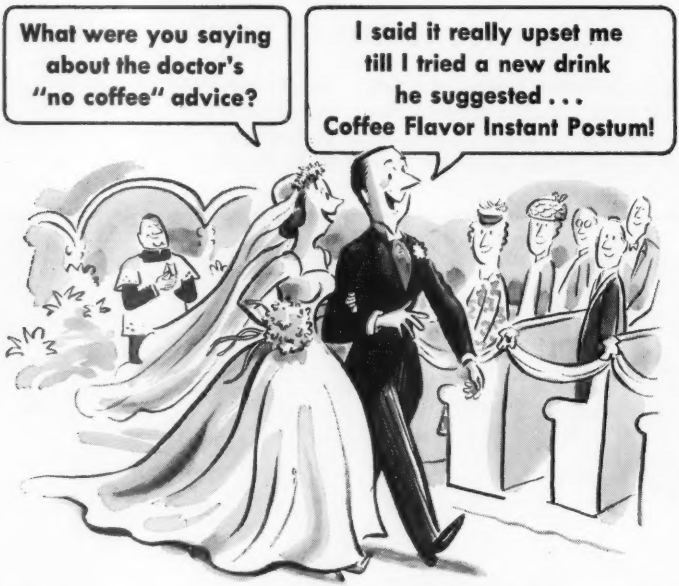
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Hypertensive symptoms relieved in 96% of patients

"Comparison of pentolinium [ANSOLYSEN] with other preparations in 25 patients with severe essential hypertension, for whom all other methods of management had failed, showed that pentolinium is the most effective of available agents in reducing dangerously high blood pressure to the desired levels, and in modifying some of the complications of hypertension, as cardiac decompensation, cardiomegaly and retinopathy. . . .

"In 96 per cent (24 patients) clinical symptoms were relieved and the blood pressure maintained at comfortable levels. . . ."[1]

ANSOLYSEN®

TARTRATE — **Pentolinium Tartrate**

Lowers Blood Pressure

1. Albert, A., and Albert, M.: Am. Pract. & Dig. Treat. 7:986 (June) 1956.

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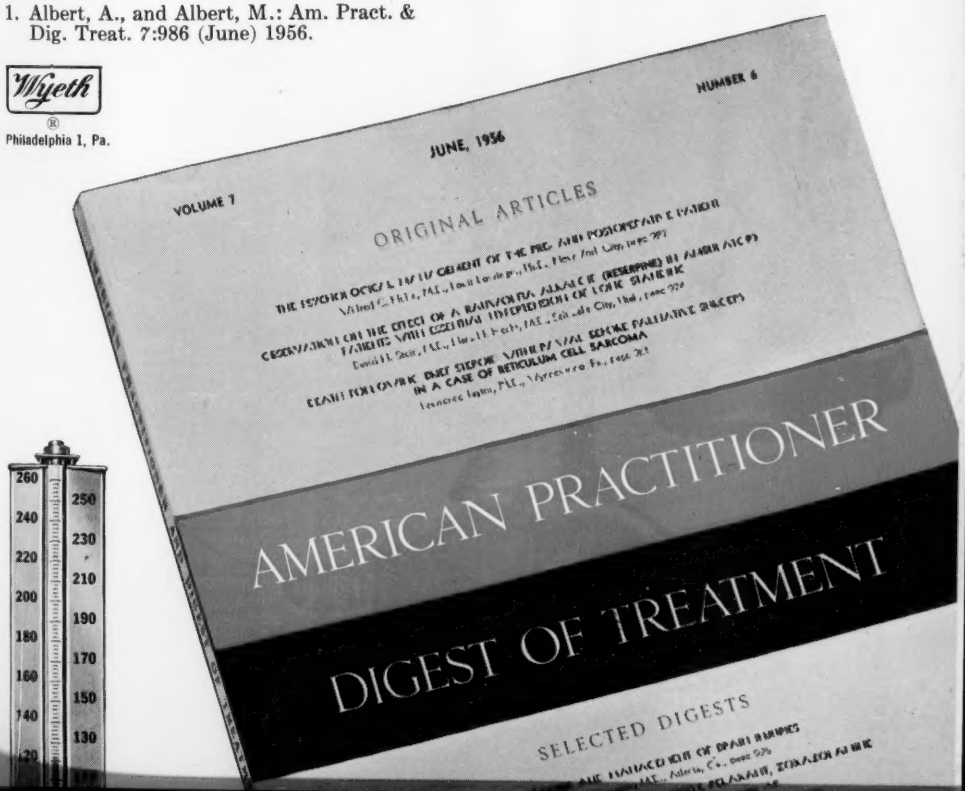
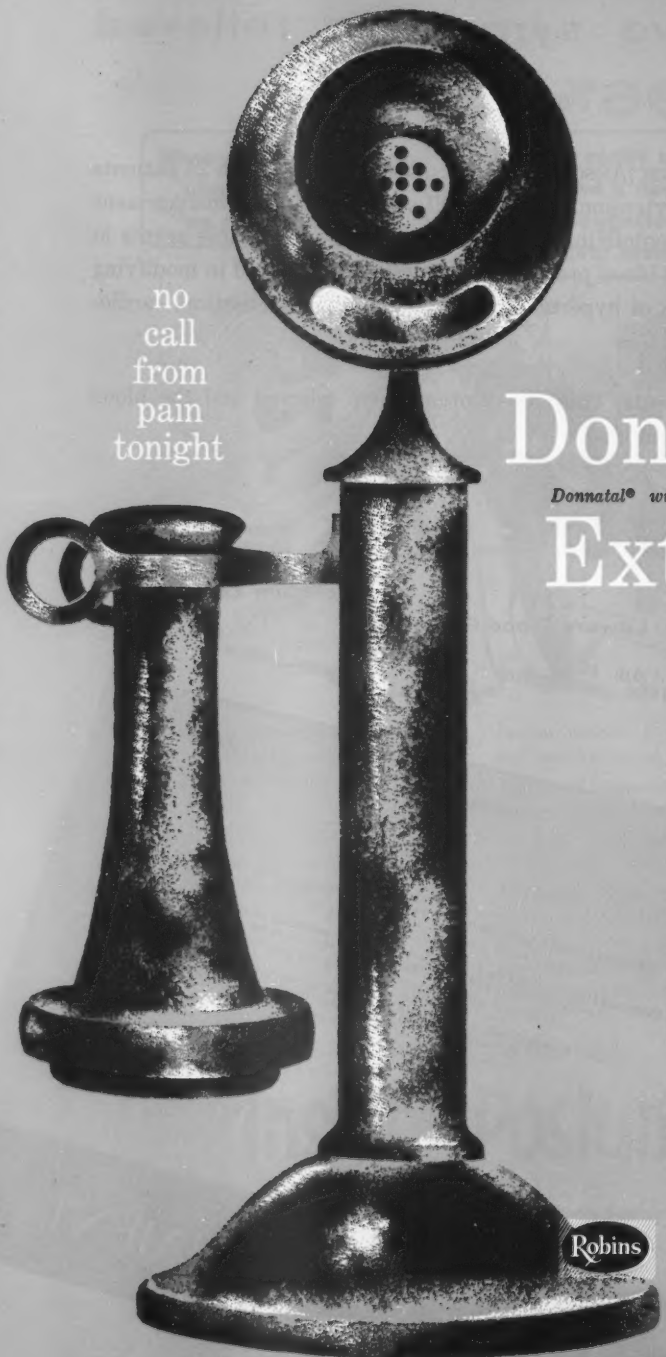
Philadelphia 1, Pa.



for the first time...extended action codeine



no call from pain tonight

10 to 12 hours uninterrupted pain relief in a single tablet

Donnagesic®

Donnatal® with Codeine extended action tablets

Extentabs

- no up-and-down analgesia
- better codeine toleration

Belladonna alkaloids and phenobarbital, as in Donnatal, induce mild sedation, reducing pain consciousness and anxiety. Patient is protected from spasm. Codeine constipation, nausea and vomiting are avoided. Phenobarbital directly augments the potent analgesic effect of codeine.[1] Indicated wherever codeine is indicated—in pain or cough.

Donnagesic No. 1 (pink)

CODEINE Phosphate (¾ gr.)	48.6 mg.
Hyoscyamine Sulfate	0.3111 mg.
Atropine Sulfate	0.0582 mg.
Hyoscine Hydrobromide	0.0195 mg.
Phenobarbital (¾ gr.)	48.6 mg.

Donnagesic No. 2 (red)

CODEINE Phosphate (1½ gr.)	97.2 mg.
Hyoscyamine Sulfate	0.3111 mg.
Atropine Sulfate	0.0582 mg.
Hyoscine Hydrobromide	0.0195 mg.
Phenobarbital (¾ gr.)	48.6 mg.

1. Goodman, L. S., and Gilman, A.: The Pharmacologic Basis of Therapeutics, N. Y., The Macmillan Co., 1955; p. 137.

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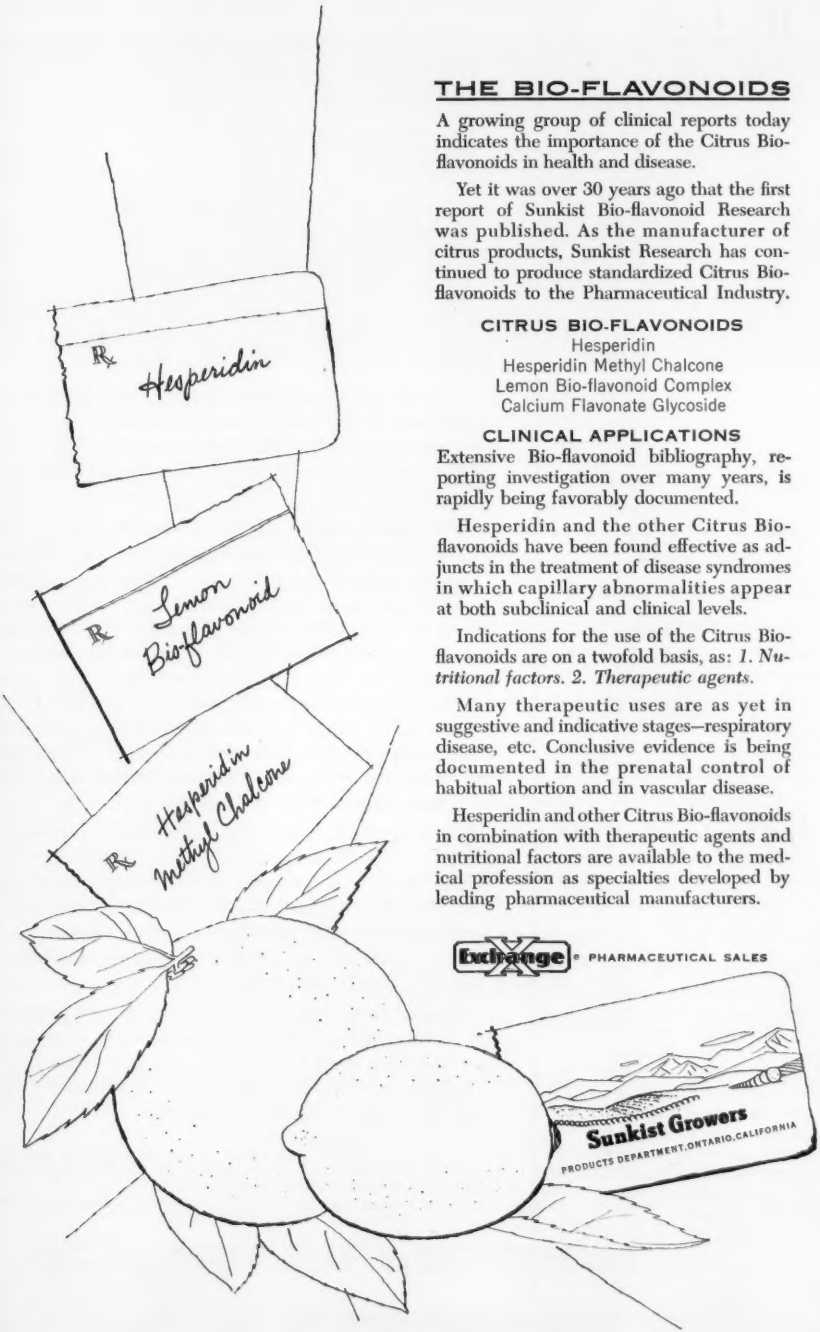


THE BIO-FLAVONOIDS

A growing group of clinical reports today indicates the importance of the Citrus Bioflavonoids in health and disease.

Yet it was over 30 years ago that the first report of Sunkist Bio-flavonoid Research was published. As the manufacturer of citrus products, Sunkist Research has continued to produce standardized Citrus Bioflavonoids to the Pharmaceutical Industry.

CITRUS BIO-FLAVONOIDS

Hesperidin
Hesperidin Methyl Chalcone
Lemon Bio-flavonoid Complex
Calcium Flavonate Glycoside

CLINICAL APPLICATIONS

Extensive Bio-flavonoid bibliography, reporting investigation over many years, is rapidly being favorably documented.

Hesperidin and the other Citrus Bioflavonoids have been found effective as adjuncts in the treatment of disease syndromes in which capillary abnormalities appear at both subclinical and clinical levels.

Indications for the use of the Citrus Bioflavonoids are on a twofold basis, as: *1. Nutritional factors. 2. Therapeutic agents.*

Many therapeutic uses are as yet in suggestive and indicative stages—respiratory disease, etc. Conclusive evidence is being documented in the prenatal control of habitual abortion and in vascular disease.

Hesperidin and other Citrus Bio-flavonoids in combination with therapeutic agents and nutritional factors are available to the medical profession as specialties developed by leading pharmaceutical manufacturers.

Exchange • PHARMACEUTICAL SALES

Richest in Thiamine among whole-grain cereals

IN GERIATRIC NUTRITION
In the problems of geriatric nutrition, of dealing with the self-imposed restrictions and distorted appetites of the aged, oatmeal offers definite advantages. It provides good protein, valuable vitamins and minerals, is low in sodium and purines, is easily eaten, readily digested, and promptly utilized.

And No Vitamin Loss in Processing

Oatmeal is naturally "considerably richer"[1] in vitamin B_1 than other whole-grain cereal breakfast foods.

Careful selection of the oats produces remarkable uniformity of nutrient contents. Repeated quantitative analyses of all rolled oats processed at the mills of the Quaker Oats Company demonstrate the relative constancy of their B vitamin concentrations.

Neither the milling of rolled oats nor their cooking in the home results in significant vitamin loss.

In the milling, the oats—after being mechanically freed from extraneous material—are mildly processed at temperatures not to exceed 200° F., then cooled and hulled. The resulting "groats" are steamed and rolled to form standard oat flakes. For quick-cooking thinner flakes, the groats are cut into 2 to 4 pieces before steaming. The parts richest in vitamin concentration—the germ and the outer cellular layers of the oat seed—are retained, and remain virtually unchanged in vitamin values.

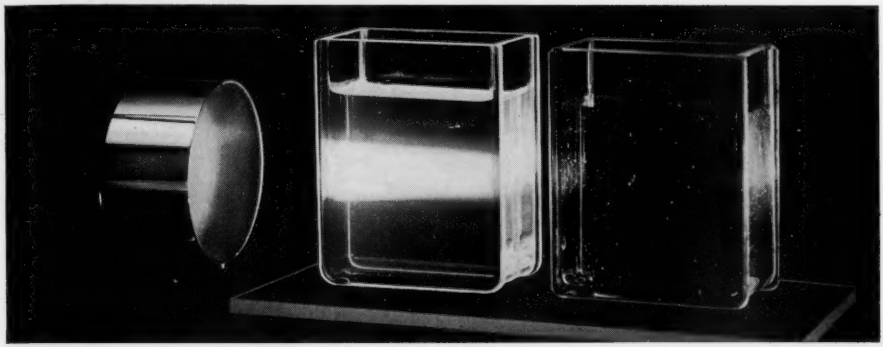
Cooking of oatmeal in the home leads to no appreciable vitamin loss. According to a symposium, prepared under the auspices of the Council on Foods and Nutrition of the American Medical Association, "one hundred and twenty minutes' cooking in a double boiler did not cause any appreciable loss of thiamine from rolled oats."[2]

Quaker Oats and Mother's Oats, the two brands of oatmeal offered by The Quaker Oats Company, are identical. Both brands are available in the Quick (cooks in one minute) and the Old-Fashioned varieties which are of equal nutrient value.

1. Maynard, L.A., and Nelson, W.L., in Handbook of Nutrition, American Medical Association, ed. 2, Philadelphia, The Blakiston Company, 1951, p. 625.
2. Aughey, E., and Daniel, E.P., cited by Maynard, L.A., and Nelson, W.L.: Foods of Plant Origin, ibid.

The Quaker Oats Company
CHICAGO

THIRD REPORT



ANOTHER HIGHLIGHT ON LECITHIN – A NATURAL PHOSPHATIDE

Phosphatides – Clearing Agents of Blood Plasma

Phosphatides have been found in all vegetable and animal cells. There seems little doubt that they are part of the basic structure of protoplasm and also enter into cell metabolism. The most abundantly found phosphatides are the lecithins, whose surface active properties, when combined with proteins and carbohydrates, play an important role as physiologic emulsifiers of fats and oils.[1]

The following considerations highlight the importance of *adequate lecithin plasma concentrations.*

Phosphatides together with cholesterol are found in plasma in combination with proteins and circulate as lipoproteins.[2] The phosphatides in plasma protein are believed to be highly essential for the stability of the complex colloidal system represented by blood plasma.[3] A phosphatide content of 30% or more seems necessary to keep the plasma clear and non-lipemic;[2] lower concentrations will cause the plasma to remain cloudy. (In human plasma lecithin makes up about 80% of the phosphatides present; others are sphingomyelin and cephalin.[2]) A constantly cloudy, lipemic serum can be considered a sign of disturbed fat metabolism, which has been incriminated in the pathogenesis of many serious disturbances. Research on lecithin's potentially useful role in the management of the more complicated forms of deranged lipid and cholesterol metabolism – as in essential hyperlipemia, idiopathic familial hypercholesteremia, xanthomatosis and diabetes – is now being actively conducted. If you are interested in the progress of this research or if you desire to have clinical trial supplies, won't you write to us?

An excellent source of lecithin is Glidden's "RG" Oil-free Soya Lecithin, a highly purified extract containing a minimum of 95% phospholipids. It is packed in a specially designed 8 oz. container to maintain its purity and freshness and is available at your drugstore.

Investigators of lecithin have used quantities from 7.5 to 30 grams daily in divided doses (3 teaspoonfuls equal 7.5 grams).

Administration: "RG" Lecithin is presented in palatable granules which may be taken plain, in milk, in orange juice or other citrus juice, or sprinkled on cereal.

Literature available on request.

Bibliography: 1. West, E. S., and Todd, W. R.: Textbook of Biochemistry, New York, The Macmillan Company, 1952, p. 184. • 2. Drill, V. A.: Pharmacology in Medicine, New York, McGraw-Hill Book Company, Inc., 1954, p. 64/6. • 3. Ahrens, E. H., Jr., and Kunkel, H. G.: J. Exper. Med. *90*:409 (Nov. 1) 1949.

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Wine—the classic beverage
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through its flavorful esters
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the olfactory sense, the gustatory papillae,
and hence the appetite even in anorexic states.

No longer is its use based solely on tradition or psychological appeal, for extensive research is pointing up the physiological value of wine as an aliment as well as a pleasant aperitif.

We now know *why* a glass of Port, Sherry, Burgundy, Sauterne—
depending on individual taste—can aid
the digestion as well as the appetite
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We know, moreover, that wine possesses significant vasodilating, diuretic and relaxant properties of value in the field of cardiology,
that its moderate content of alcohol is metabolized readily
even by diabetics, that its gentle sedative action at
bedtime affords a valuable aid to normal sleep and may
even obviate the need for sedative drugs.

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Unbreakable plastic...no movable parts... carrying case for Adapter and medication small enough to be carried inconspicuously in pocket or purse.

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For Emergency Relief of Acute Attacks of Angina Pectoris

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Octyl nitrite (1%) in aerosol solution

Metered-dosage nebulization using the lungs as portal of entry to provide speedy relief from acute attacks of angina pectoris. Medication and unbreakable Adapter fit into pocket-size case.

(*Wood engraving by Bernard Brussel-Smith, for the Armstrong Cork Company*)

A full day's work—without Angina Pectoris

In rigorous clinical trials,[1] METAMINE SUSTAINED improved 80 (78%) of 103 patients with angina pectoris, including a group refractory to other medication.

METAMINE SUSTAINED tablets slowly release 10 mg. of METAMINE, the unique, *amino* nitrate, to provide enduring, 12-hour protection from anginal attacks.

Simplified dosage—just 1 tablet on arising, and 1 *before* the evening meal.

Greater economy for your angina pectoris patient.

Supplied: METAMINE SUSTAINED, 10 mg., in bottles of 50 sustained release tablets. Also available: METAMINE, 2 mg., and METAMINE (2 mg.) with BUTABARBITAL (¼ gr.), bottles of 50 tablets. THOS. LEEMING & CO., INC., NEW YORK 17, N.Y.

[1]Fuller, H. L., and Kassel, L. E.: Sustained Release Metamine (triethanalomine trinitrate biphosphate) in Angina Pectoris. (in press).

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New Potentiated Pain Relief

A.P.C. WITH Demerol®

Tablets

Each tablet contains

Aspirin	200 mg. (3 grains)
Phenacetin	150 mg. (2½ grains)
Caffeine	30 mg. (½ grain)
Demerol® hydrochloride	30 mg. (½ grain)

Average Adult Dose... 1 or 2 tablets repeated in three or four hours as needed.

- *marked potentiation of analgesia*

plus

- *mild sedation*
- *antispasmodic action*
- *antipyretic action*
- *no constipation*
- *no interference with micturition*

"Such a combination has proved clinically to be far more effective and no more toxic than equivalent doses of any of these used singly."

Bonica, J.J.; and Backup, P.H. (Tacoma General Hospital, Washington): *Northwest Med.*, 54:22, Jan., 1955.

Supplied in bottles of 100 tablets.

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